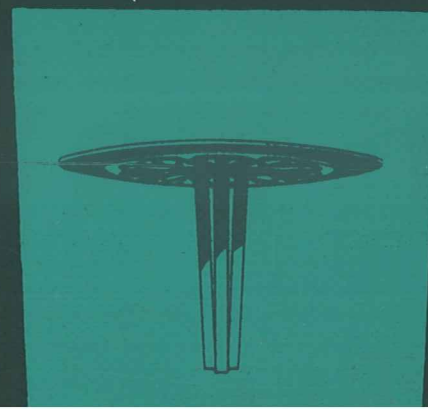
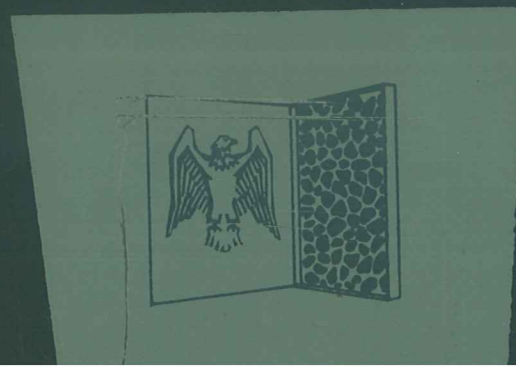


# ARCHITECTURAL APPLICATIONS OF CONCRETE IN BUILDING



*prepared for the  
1964-1965  
World's Fair in New*

BY PORTLAND CEMENT ASSOCIATION



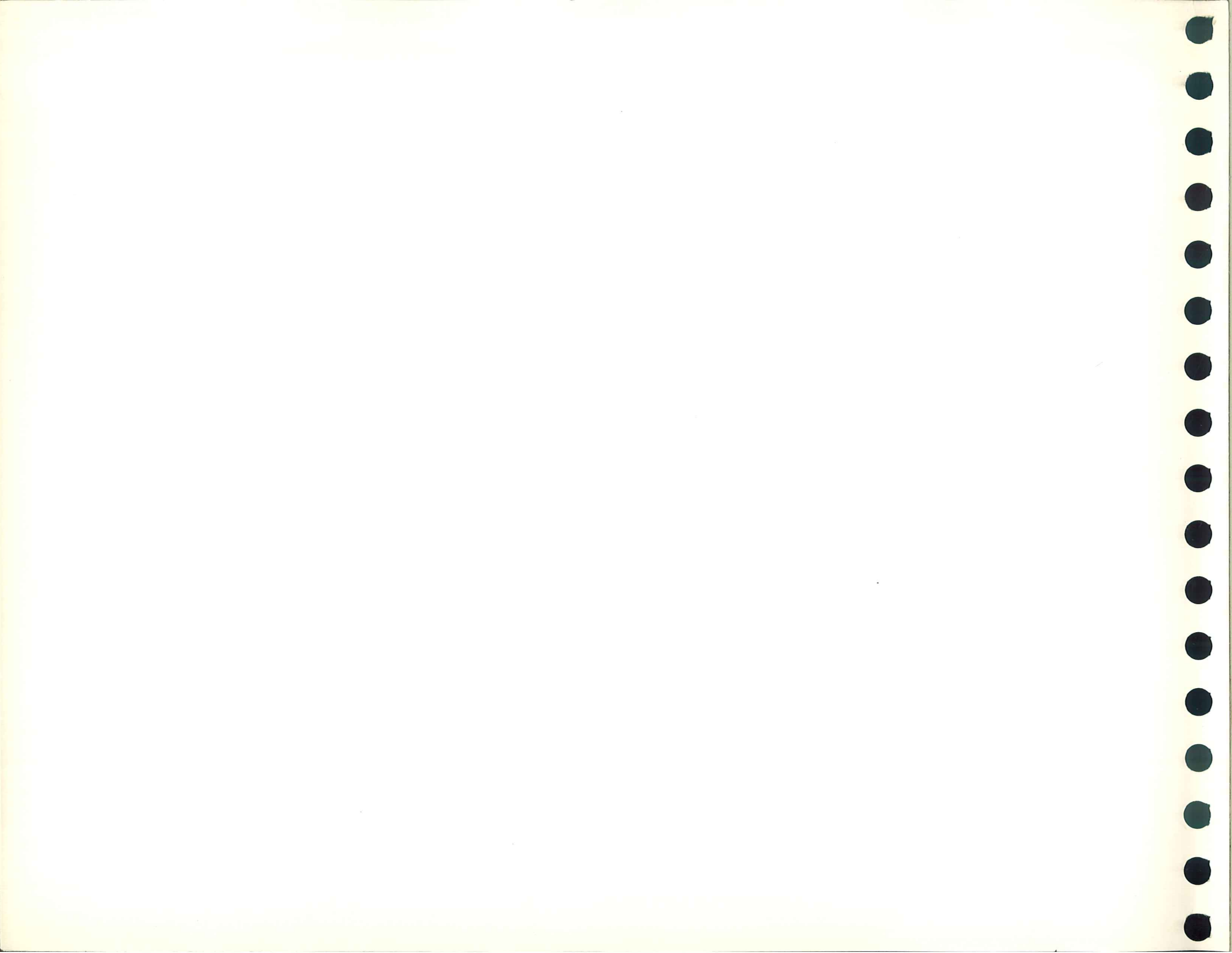


# ARCHITECTURAL APPLICATIONS OF CONCRETE IN BUILDINGS

PORTLAND CEMENT ASSOCIATION, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

The activities of the Portland Cement Association, a national organization, are limited to scientific research, the development of new or improved products and methods, technical service, promotion and educational effort (including safety work), and are primarily designed to improve and extend the uses of portland cement and concrete. The manifold program of the Association and its varied services to cement users are made possible by the financial support of over 70 member companies in the United States and Canada, engaged in the manufacture and sale of a very large proportion of all portland cement used in these two countries. A current list of member companies will be furnished on request.

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"Among other things, World's Fairs have given architects an excuse to experiment, to try new colors and new shapes. . . . World's Fair architecture thus has exhibited a flair for showmanship and novelty."

—*New York Times*

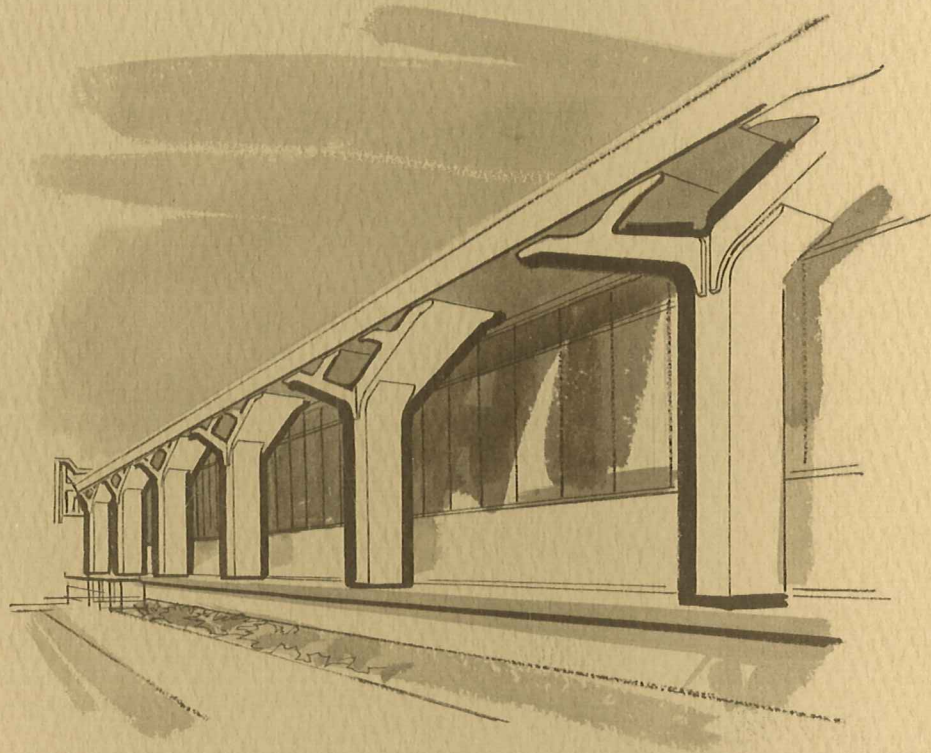


This booklet illustrates a few of the many ways architects have made use of the incomparably rich variety of colors and shapes afforded by concrete in its various applications.













FRAMES



2

The graceful Y-shaped frame members of this building at Yale University illustrate the beauty and practicality of precast units—concrete members assembly-line cast at ground level, taking advantage of form reuse.









4

Precast frame bents span the entire width of the gymnasium and walkways of this Alabama school. Reiterated the full length of the building, their cost is nominal since casting costs are lowered.





SIDNEY C. PHILLIPS JR. HIGH SCHOOL



5

Even the most complex framing problems can be solved easily and economically by such precast frame units as are used in this California school.



# 6

Naturally, precast frames can assume shapes of rectilinear functionalism, as in this Washington state bank, as well as the more intricate forms.





7

This parking garage being built in New York makes use of one of the available precast concrete systems that offer unusual versatility. As *Engineering News-Record* puts it, "Among the many advantages cited are easy dismantling. The latter feature adapts the new system to projects like civic centers and exhibitions."







8

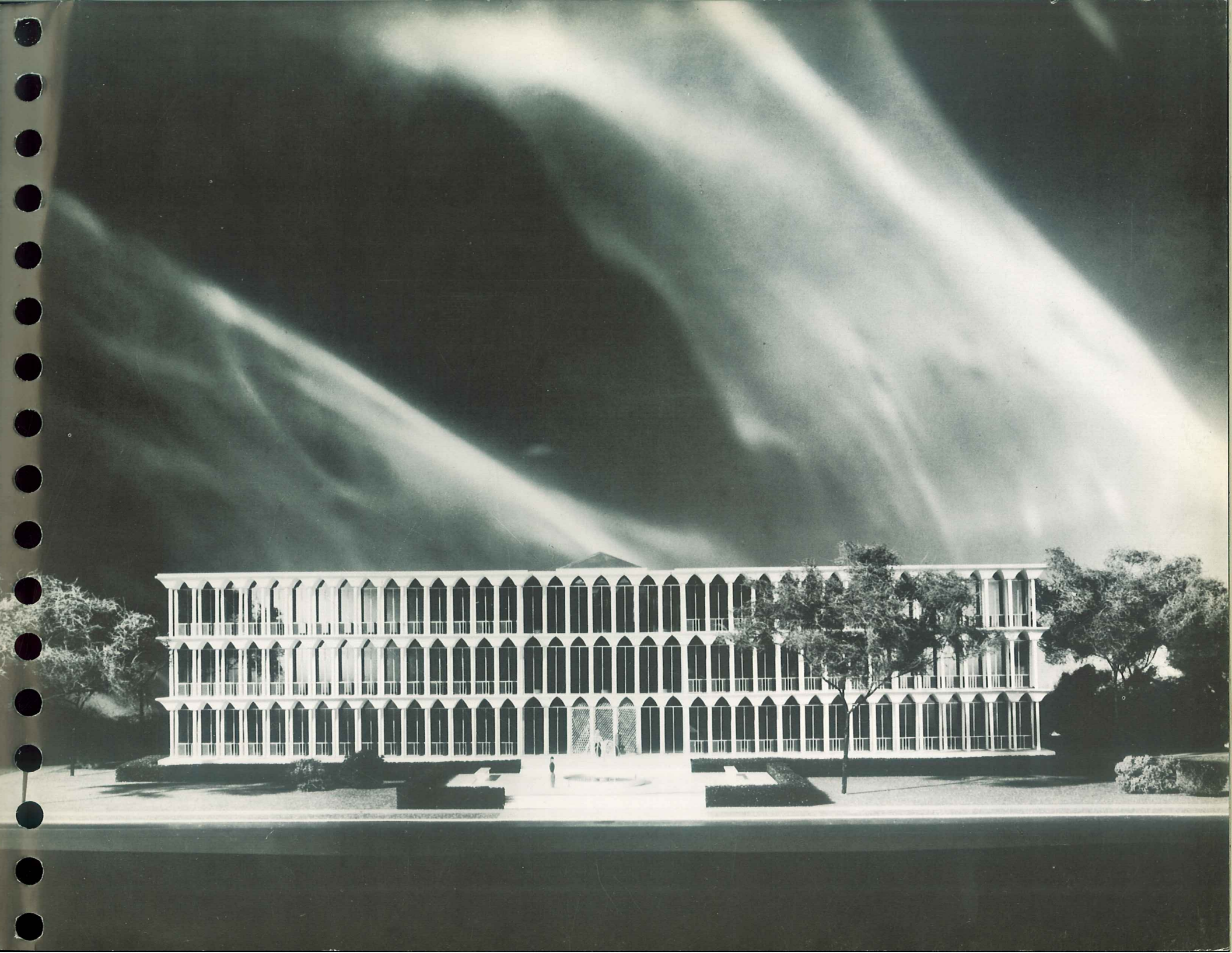
Prestressed girders in this Washington state school gymnasium stretch 150 ft. across the width of the structure.



9

The novel frame of this Michigan school building utilizes folded plate shells for the floors as well as the roof.

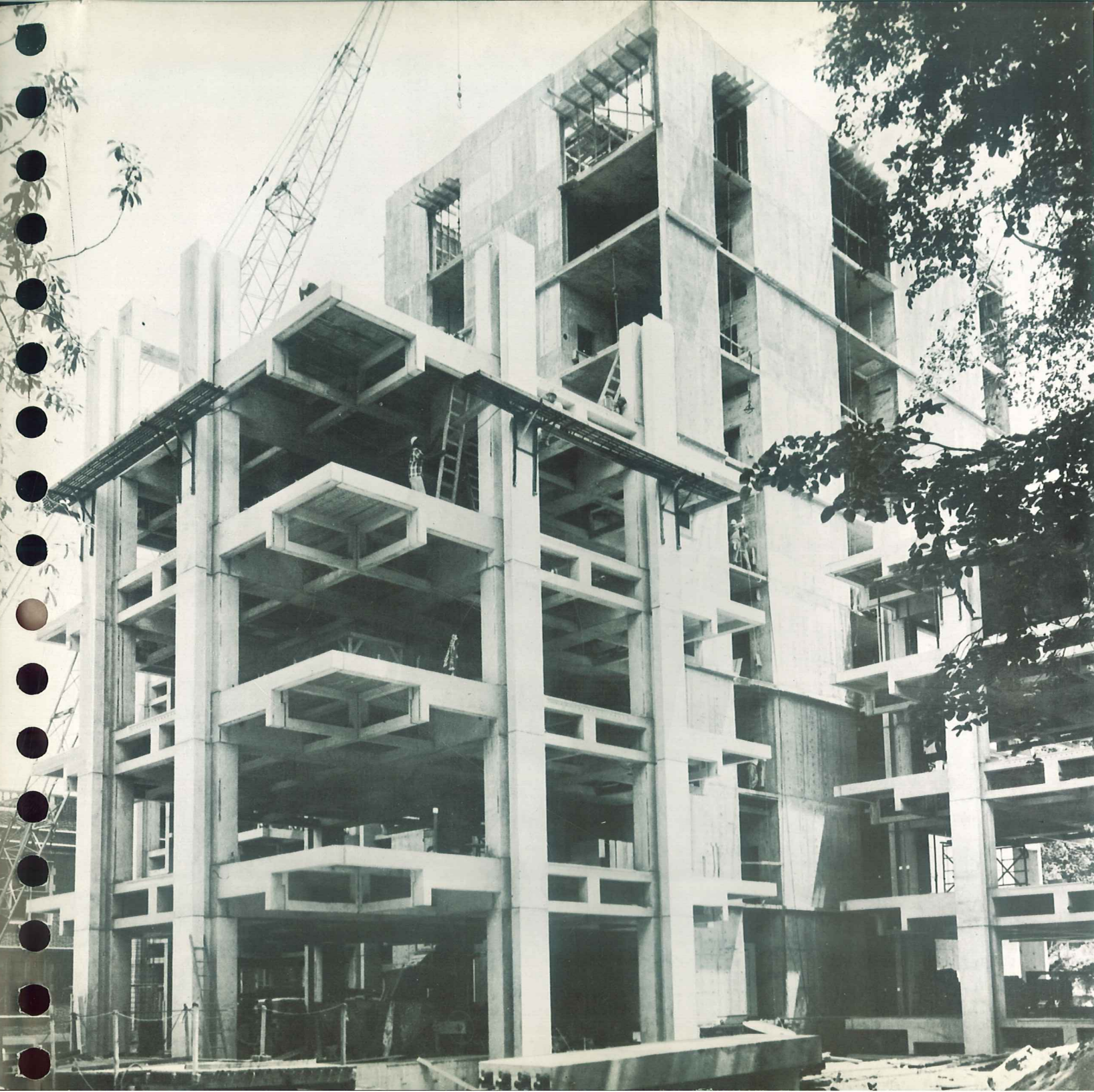




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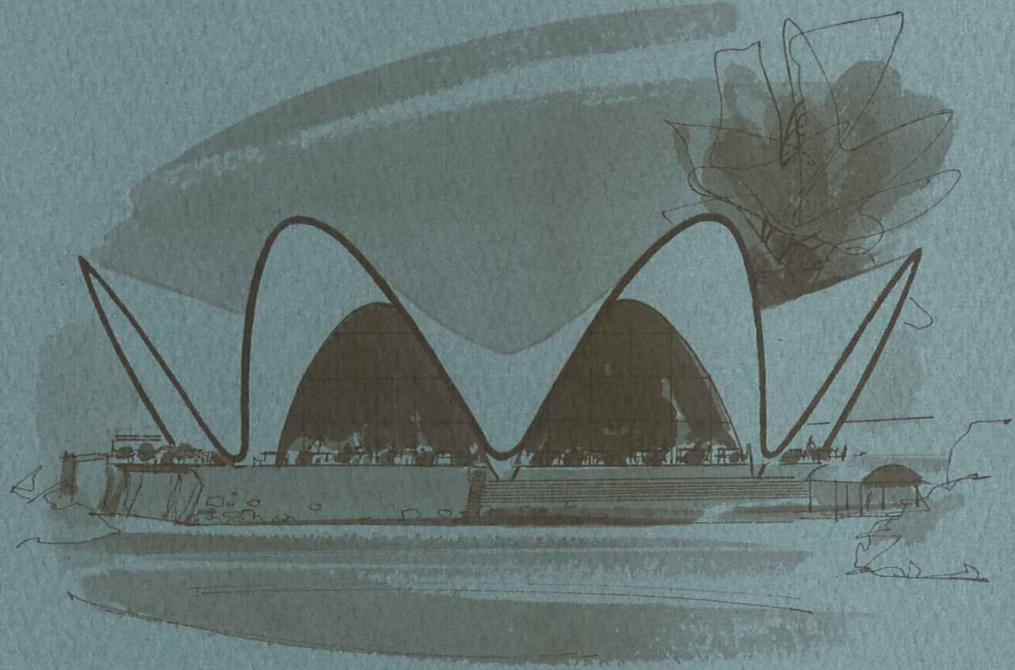
Precast and precast-prestressed frame members are delivered to the construction site ready to be assembled into the completed building frame. Speed and flexibility are the key words with this type of construction.













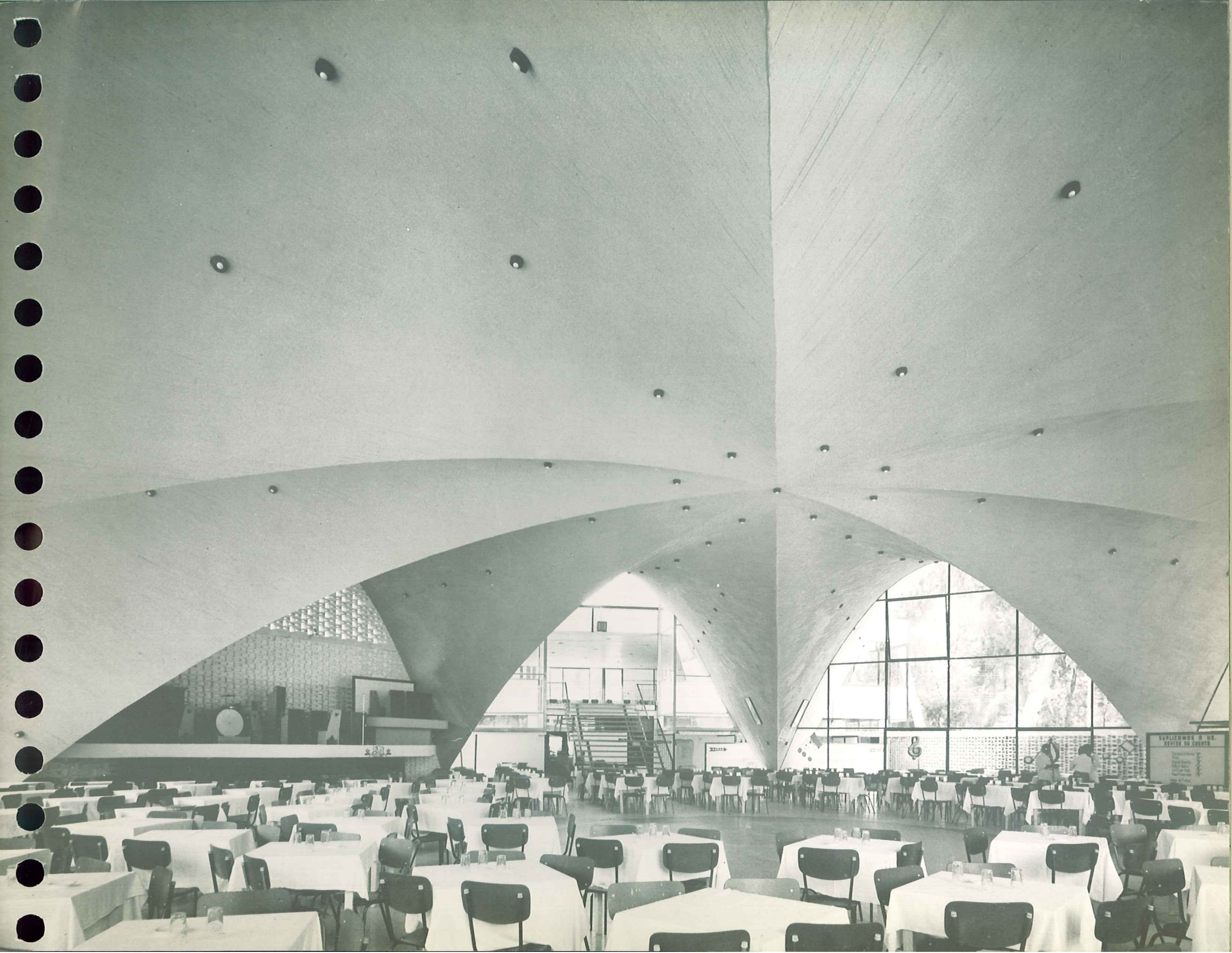


ROOFS



11

Many of the most graceful, outstandingly beautiful contemporary buildings—like this restaurant in Mexico—owe their character to the use of a concrete shell roof.



12





13

Cone-shaped shell roofs add to the gaiety of this open-air dining pavilion in Georgia. The imaginative shells set the mood for fun.





14

Concrete shells serve as both roof and frame for this Wisconsin church. Concrete structural mullions, in which are set stained glass windows, complete the structure.

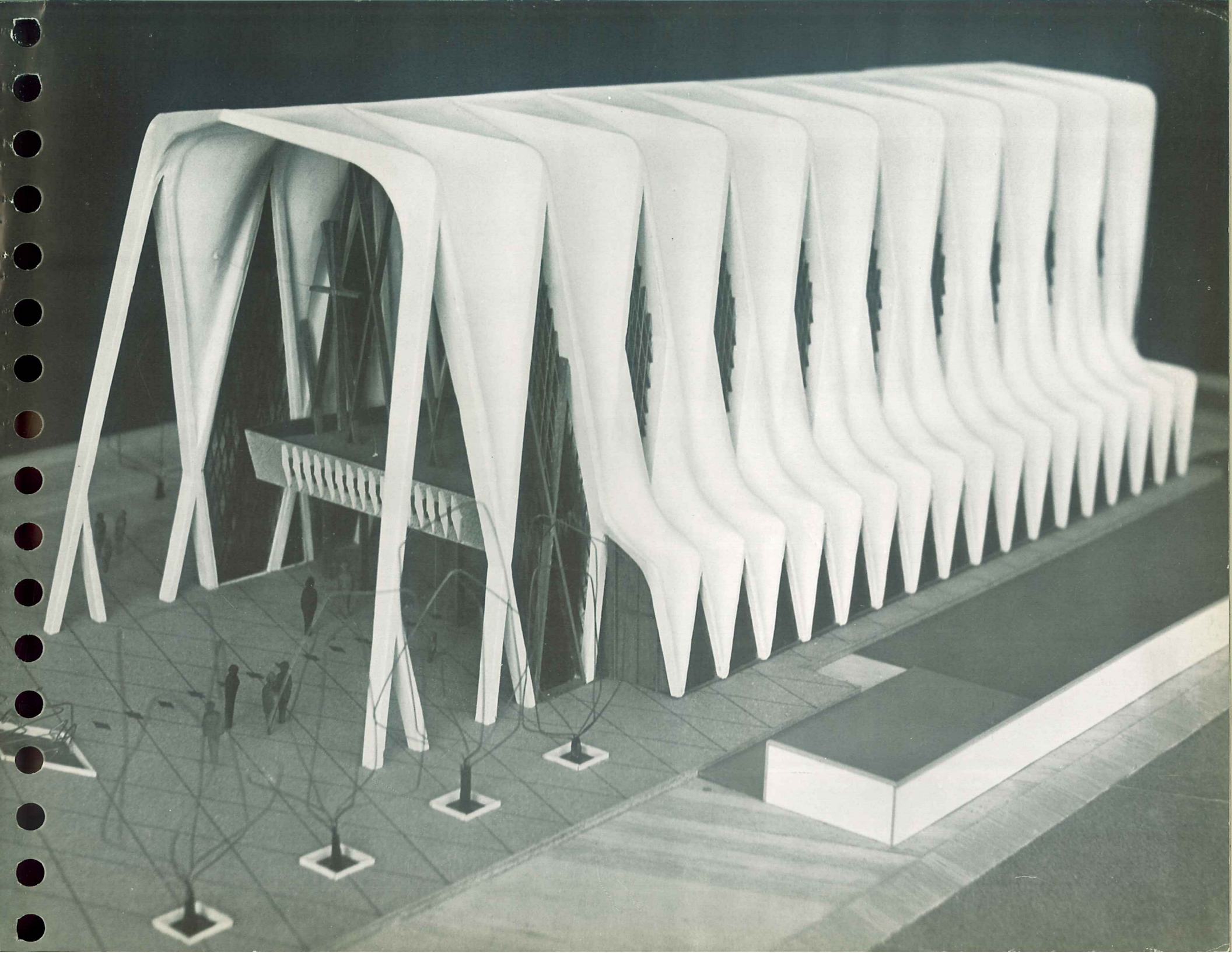




15

The design for this California church also makes use of shells for both roof and frame. The flowing form of the hyperbolic paraboloid produces a light, graceful building.

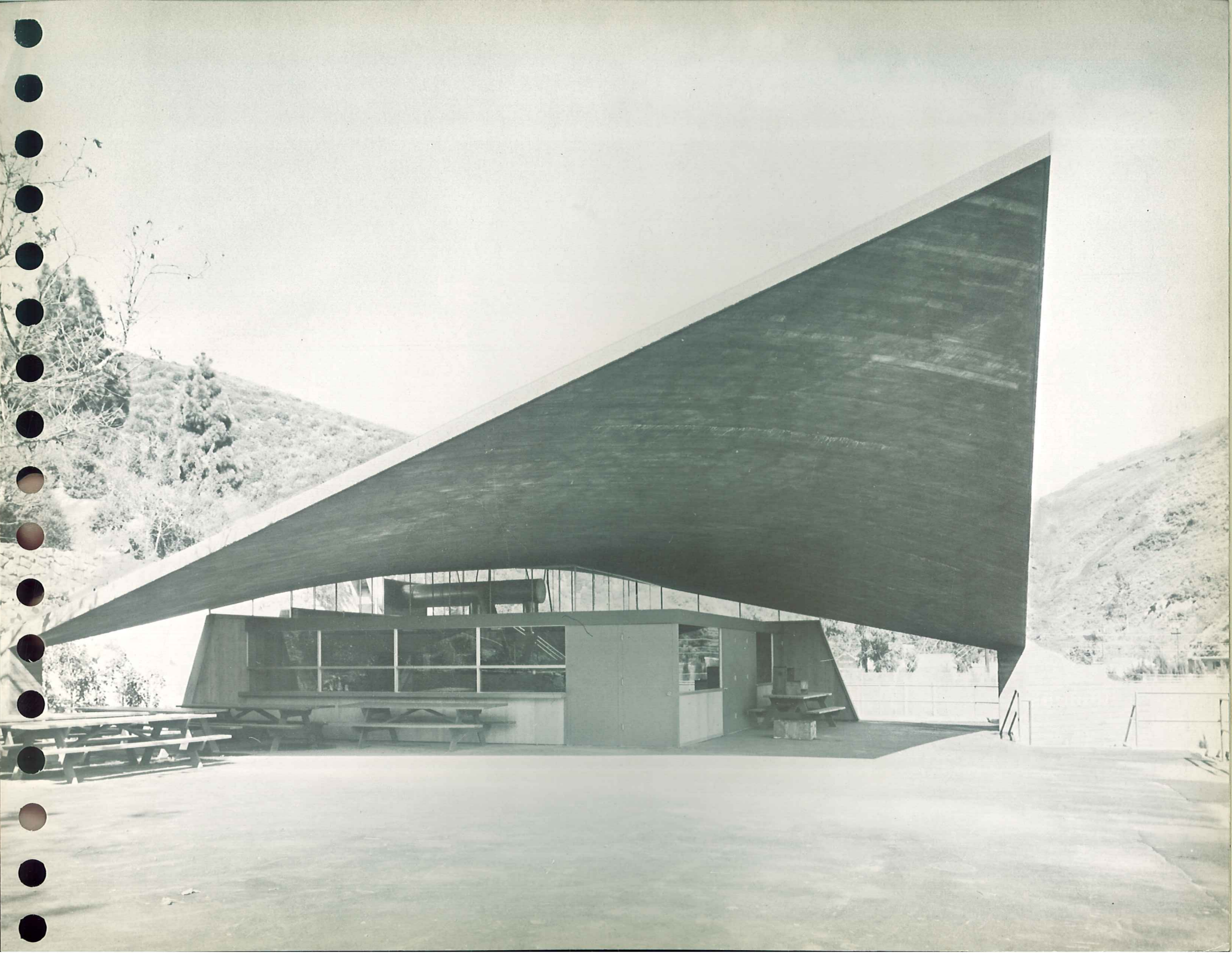




16

Poised like a bird in flight, this shell covers a refreshment stand in California. The curvature of shell roofs enables them to span great distances with thicknesses as little as 3 in. or less.

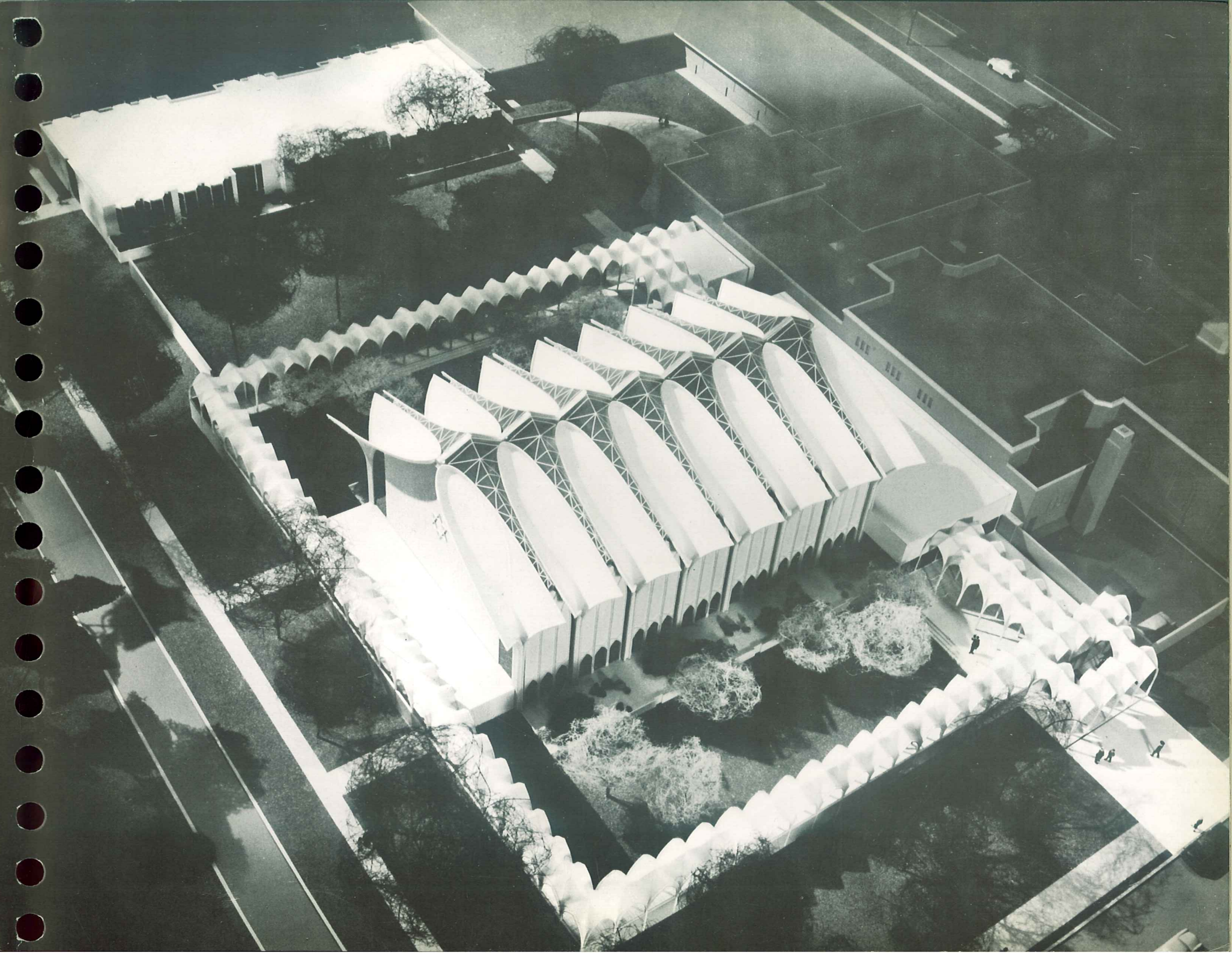




17

Concrete shells provide a novel cover for the sanctuary and walkway around this temple to be built in Illinois.





18

A few of the virtually limitless shapes that concrete shells can assume are illustrated in this Oklahoma school.

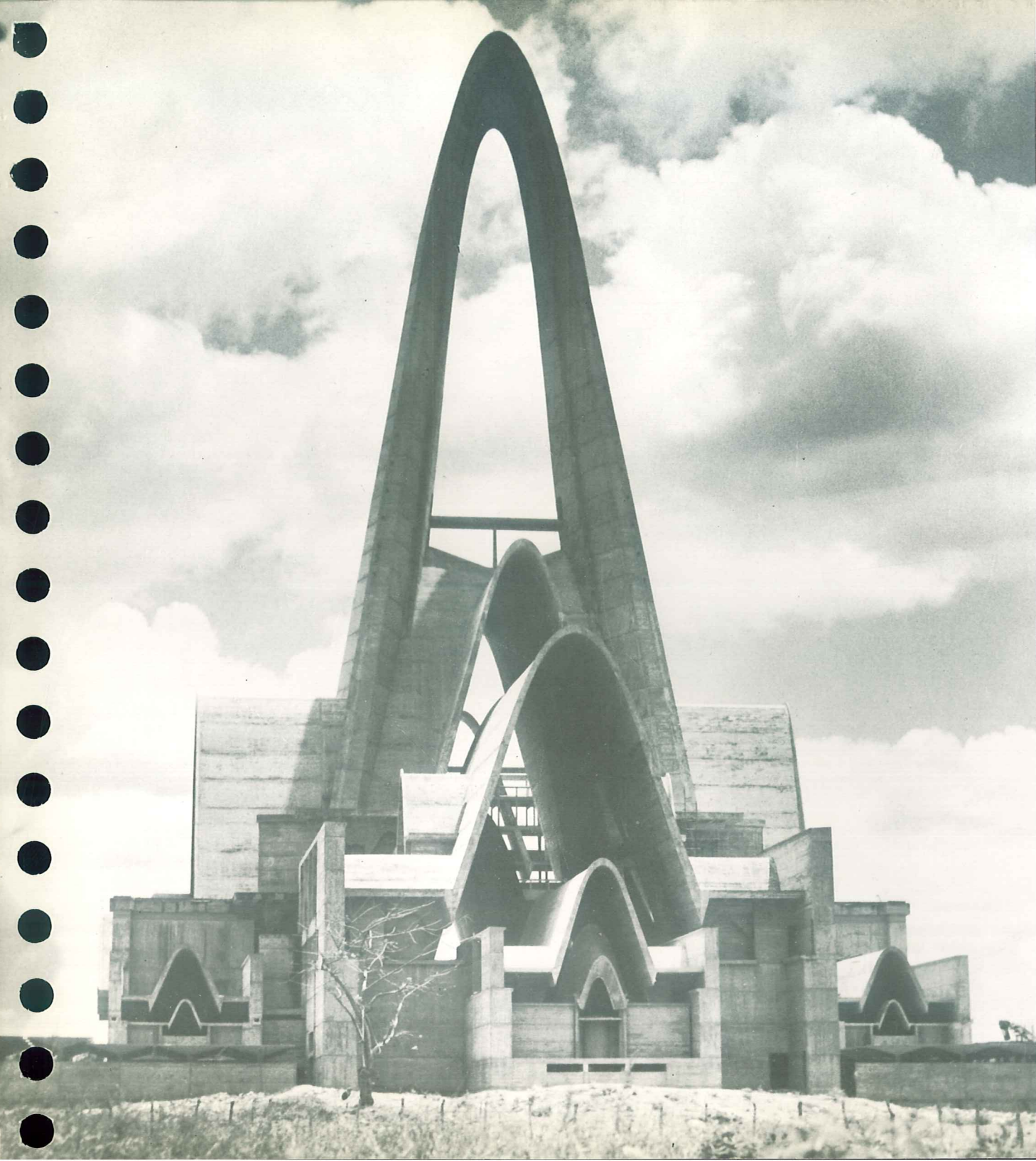




19

Soaring shells create this unique and awe-inspiring church  
in the Dominican Republic.





20

Wing-like projections of these concrete shells impart a lightness of spirit that reflects the use of this club building in Oklahoma.





21

A domed shell caps the Little Sports Palace in Rome, site of the 1960 Olympic Games. Through imaginative use of concrete, world renowned engineer Pier Luigi Nervi has created a building both graceful and heroic.





22

Triangular folded plates provide both second-story floor and roof of this classically beautiful school building in Michigan. The building is set on a concrete island amidst moats, sculpture, and plantings.





23

A new entry in the roofing field is the geodesic dome. This greenhouse in Wisconsin is composed of triangular precast concrete members joined to form the domed frame.

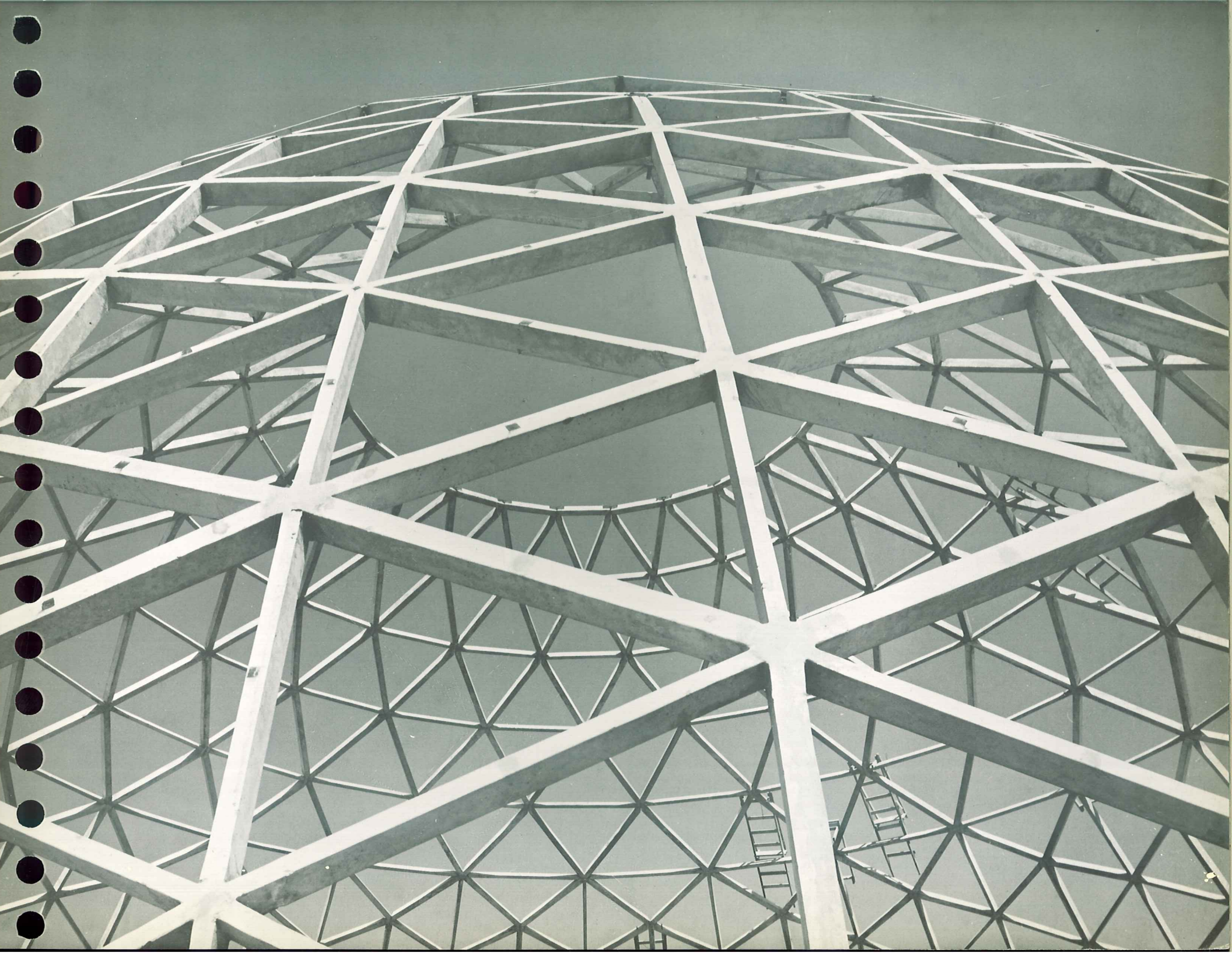






24





25





Of course, there are many types of concrete roofs and floors. In cast-in-place systems, the choice extends from the simple flat plate to this highly decorative waffle slab in a Florida office building.





27

The popular precast, prestressed floor and roof units shown here in an Oklahoma school afford large column-free floor areas for maximum space flexibility.





28

Prestressing, a construction technique that makes efficient use of concrete's inherent strength, produced this striking Florida motel. The precast and prestressed roof units cantilever out over to form, as well as protect, the walkway around the building.

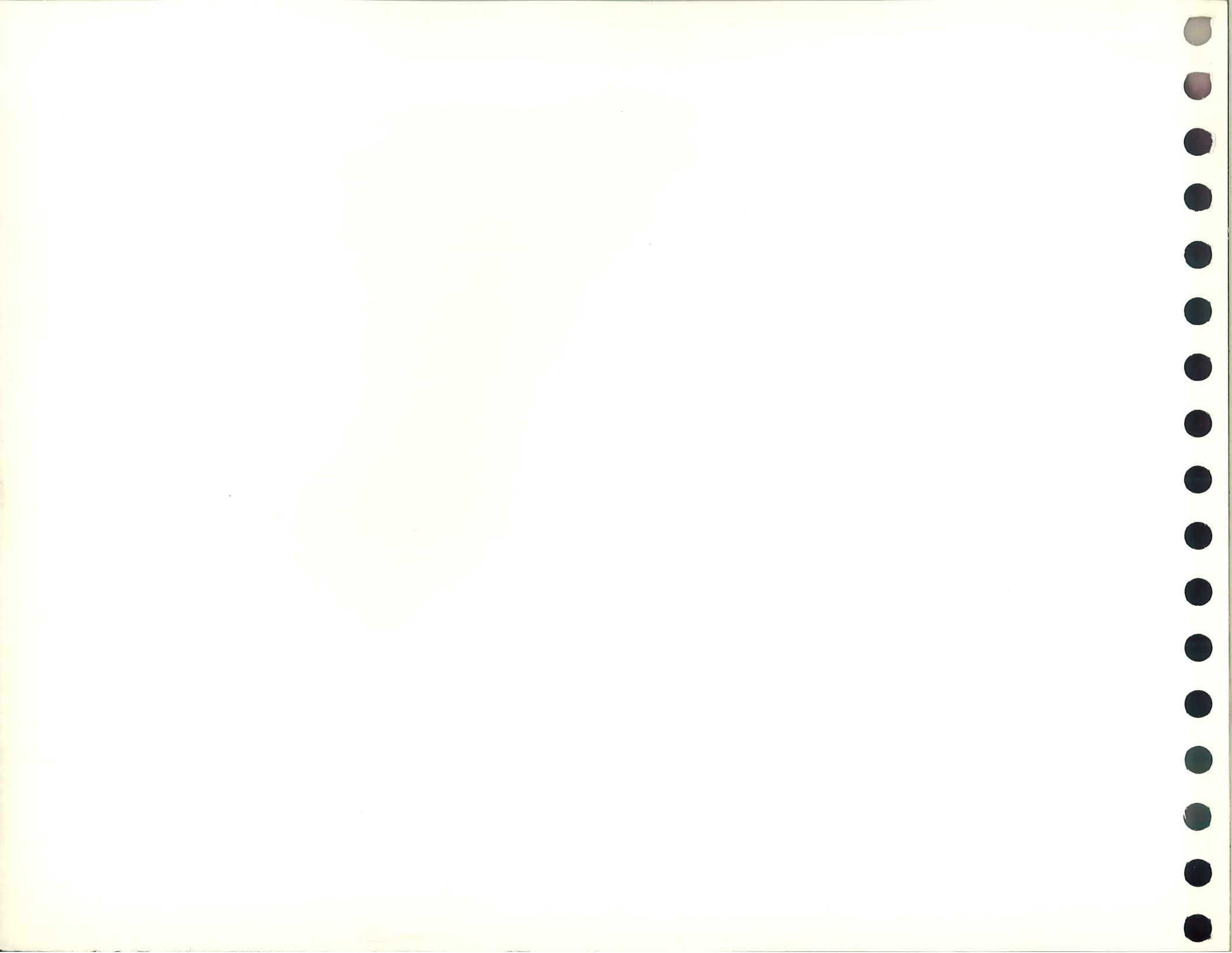




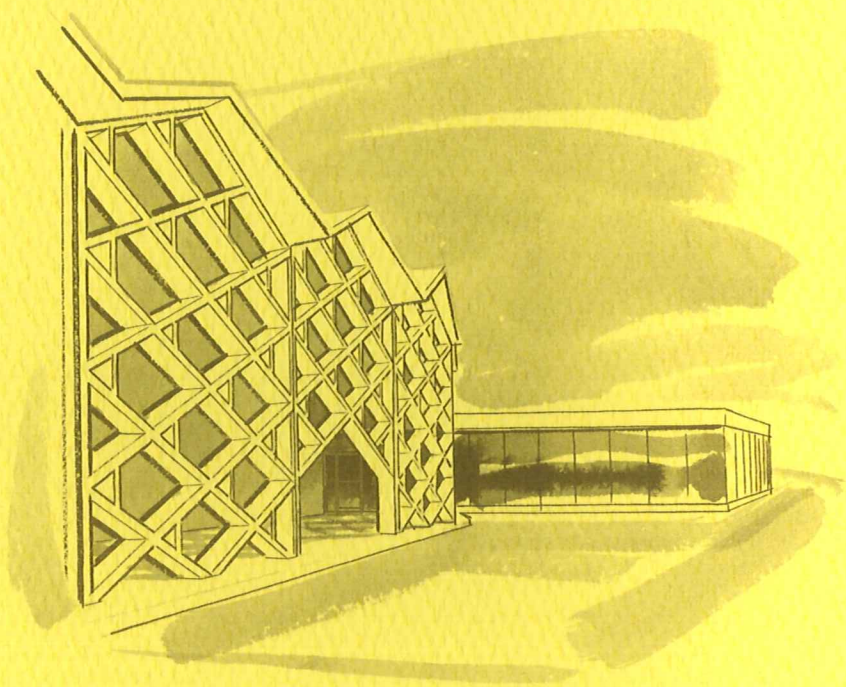
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WALLS





WALLS

30

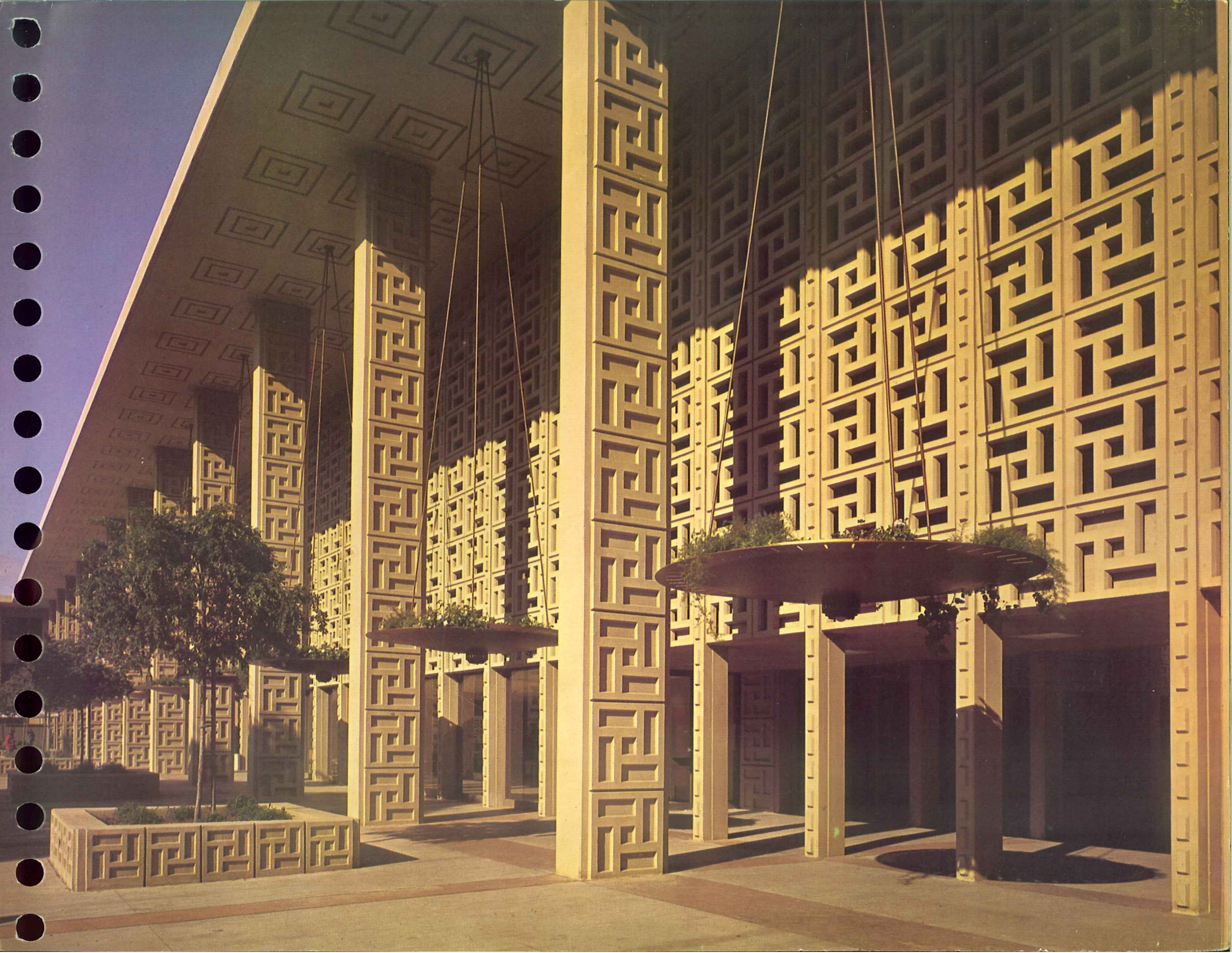
This school building in northern California illustrates the decorative capabilities of precast concrete curtain walls and screens, as well as cast-in-place columns and roof slabs.





31







32

The distinctive facade of this Connecticut office building was created by casting the concrete panels against sand molds. The relief pattern constantly changes in appearance as the sun shifts position.





33

Another example of precast panels cast against sand molds is the fascia of this Illinois bowling alley. The extremely high relief and resulting deep shadows create a pattern that "carries" for long distances.





34

This Alabama courthouse owes its beauty to the color and texture of its precast exposed-aggregate curtain wall panels and the design of the precast grille wall panels.

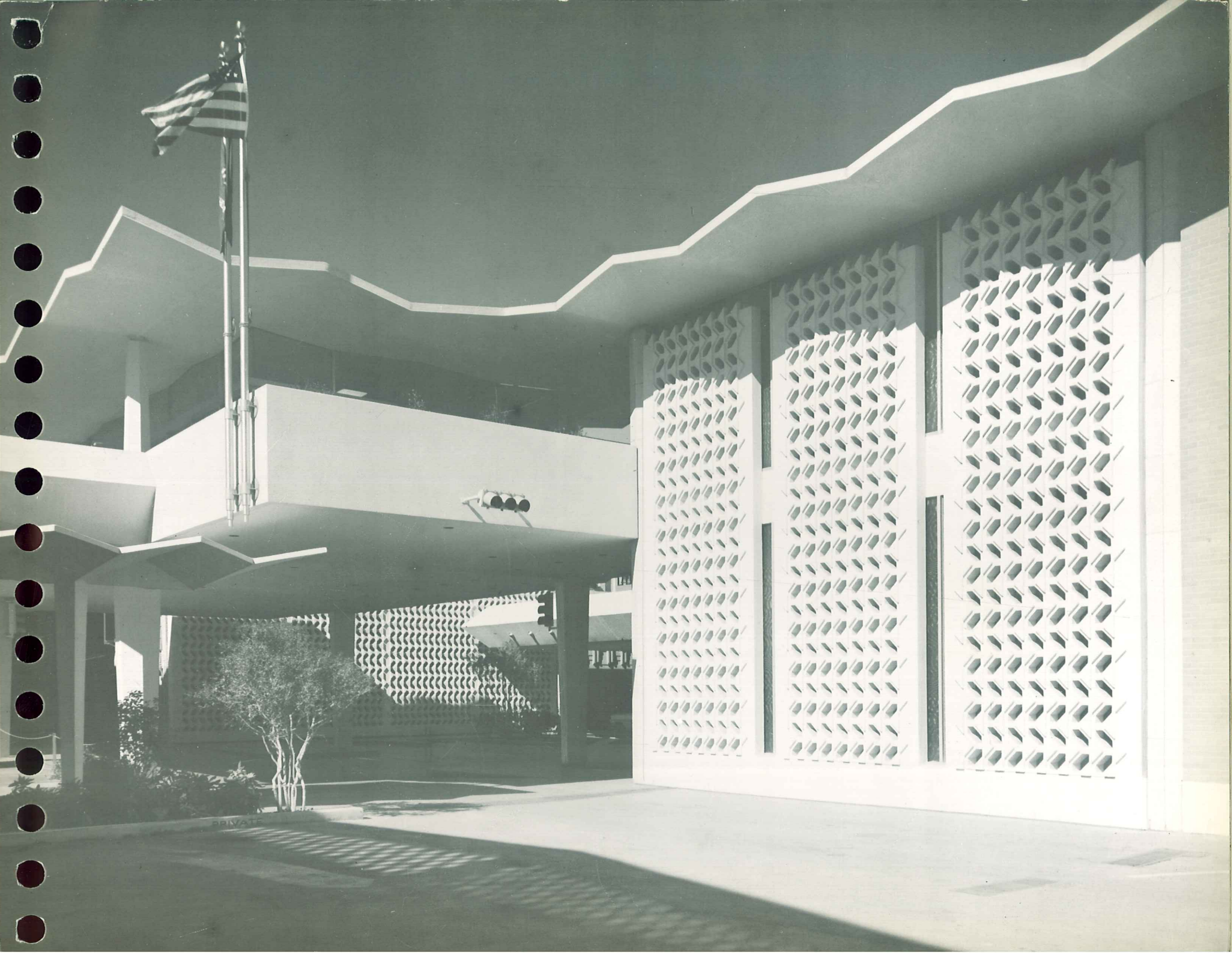




35

Precast grille wall panels, concrete masonry, and other forms of concrete construction are combined to telling effect in this Oklahoma drive-in bank.





36

This handsome office building in Texas achieves a refined beauty through the texture and color of precast panels on its side walls and the contrast of white grille panels on the other walls.







37

The simple, yet effective, triangular pattern of the precast exposed-aggregate wall panels on this Wisconsin department store lends a clean-lined, modern effect to its exterior.





38

Another distinguished office building, this time in Georgia, combines precast exposed-aggregate wall panels and grille wall units to produce a striking home for business.



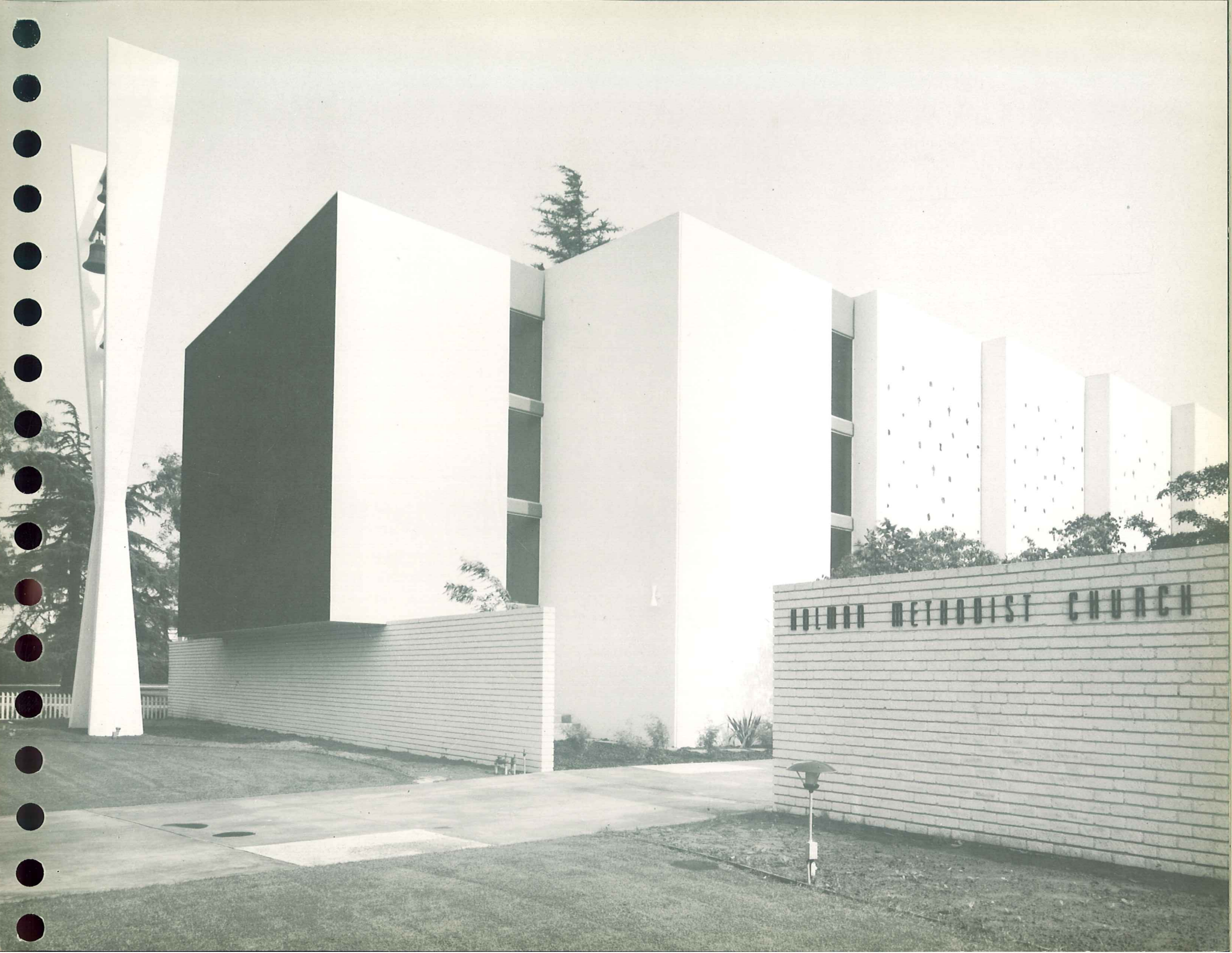


ALLSTATE INSURANCE

39

Tilt-up wall panels enclose this modern church in California. In tilt-up construction, the wall panels are cast horizontally adjacent to the perimeter of the building and then tilted up into final position.





PALMER METHODIST CHURCH

40

Canted tilt-up panels wall this impressive church in Colorado.  
The panels tie into precast frame bents on the exterior of the building.

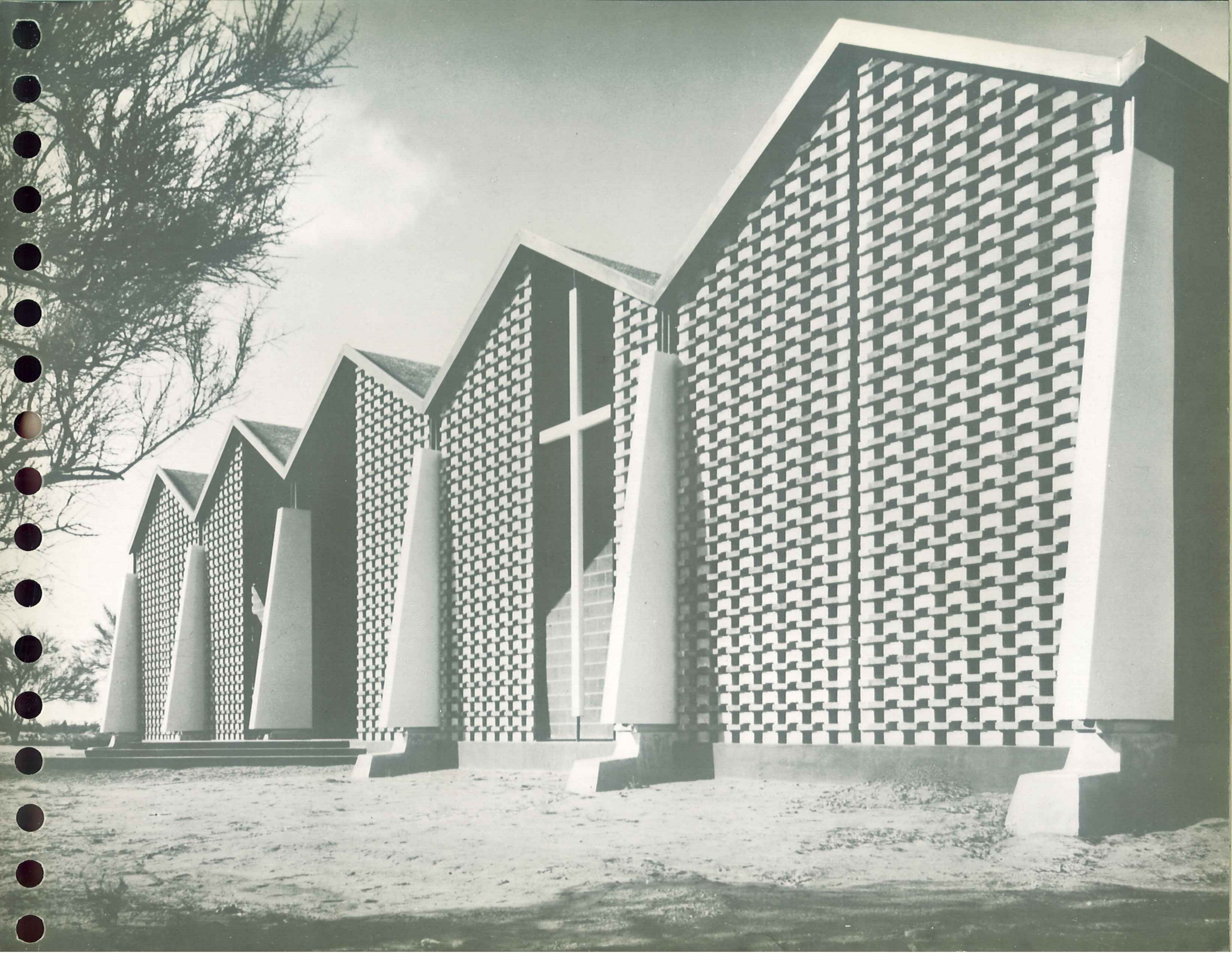




41

Stacked concrete masonry units produced this grille wall on a church in Arizona. Concrete block can be laid up in literally hundreds of patterns.

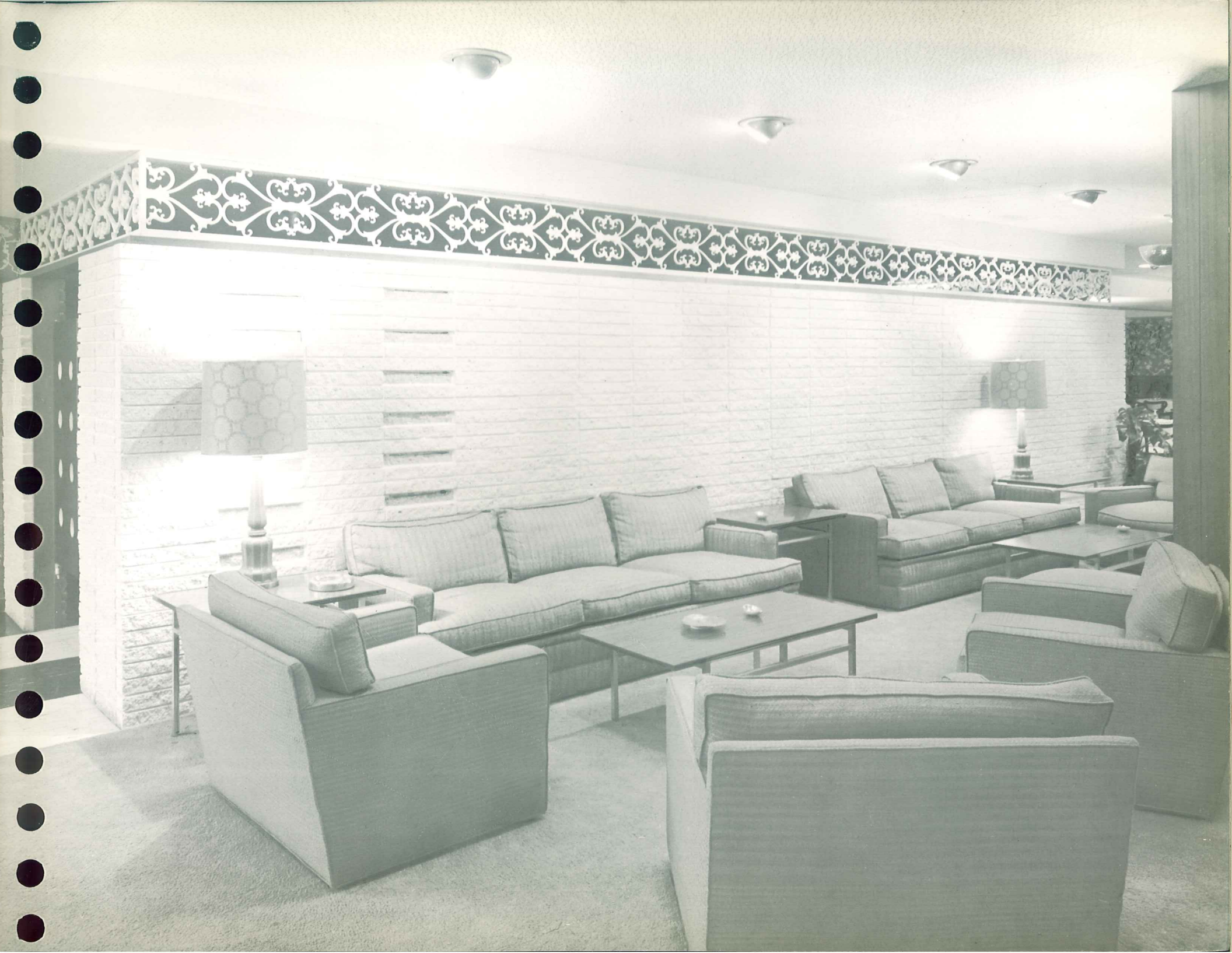




42

Slump block, one of the many variants in texture, size, shape, and color available in concrete masonry, helps create the gracious mood of this lounge in a Texas clubhouse.

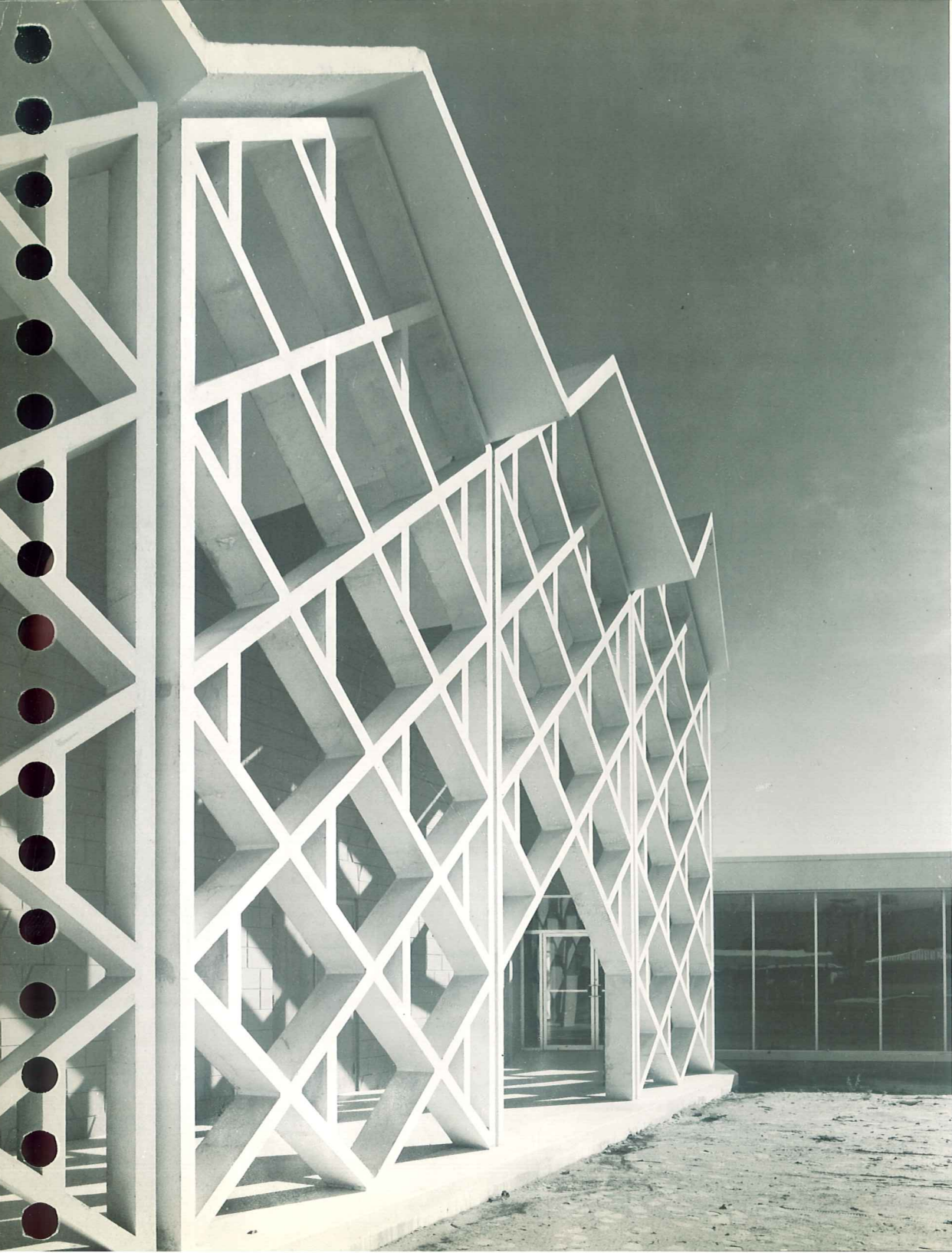




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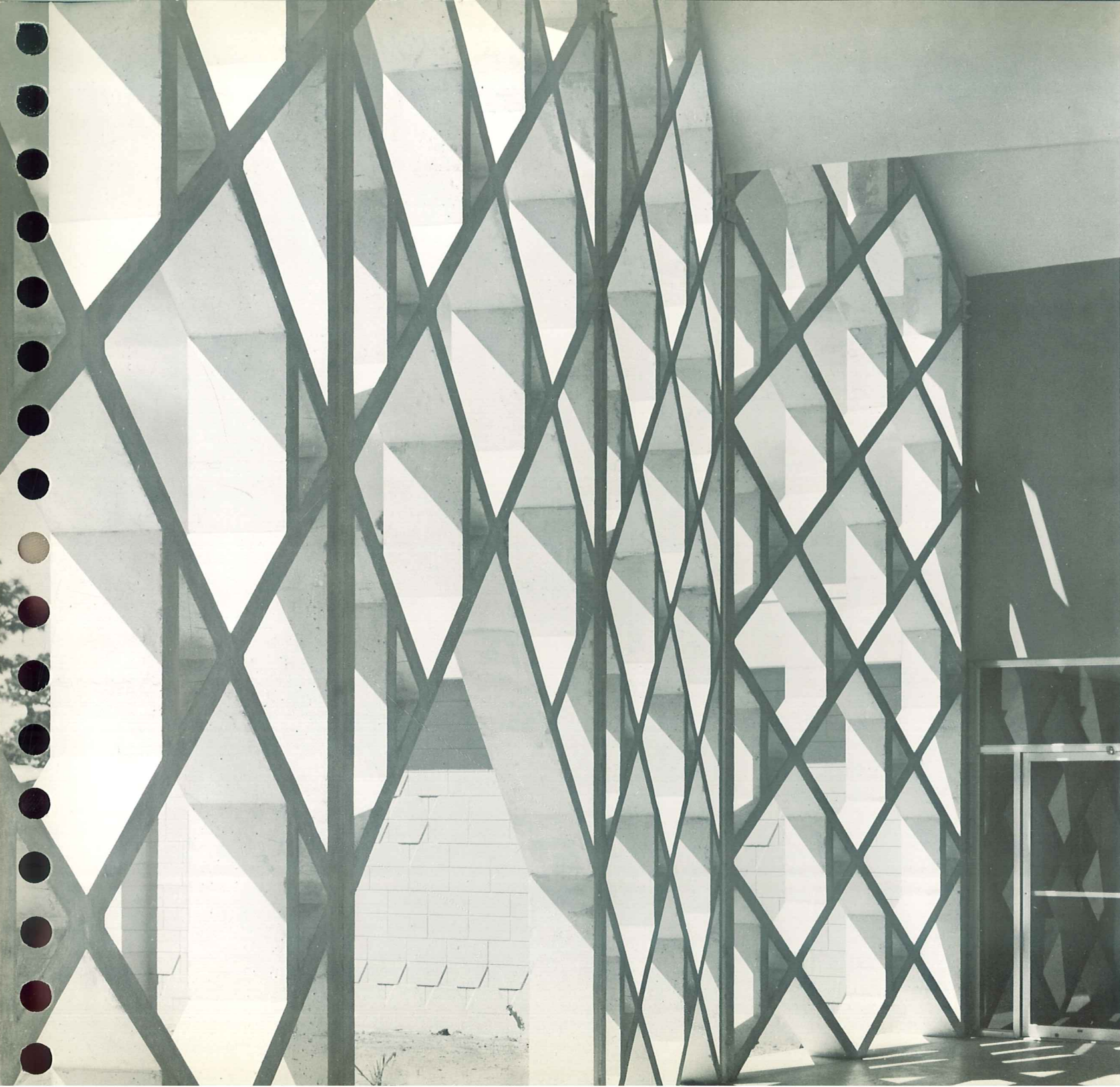
The façade of this Florida church is graced by a precast grille screen in front of a patterned concrete masonry wall, all topped off by a folded plate shell roof.





44

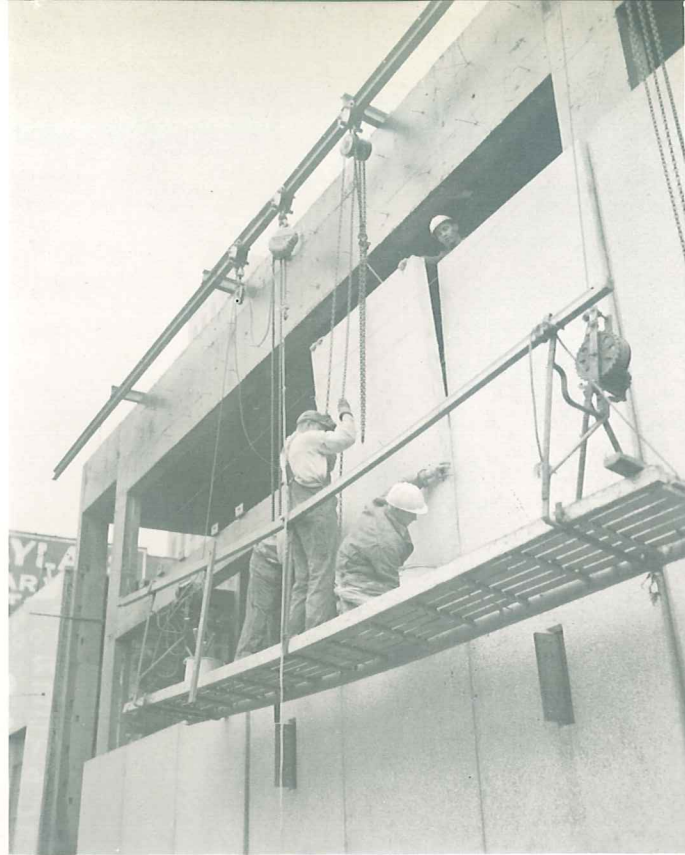


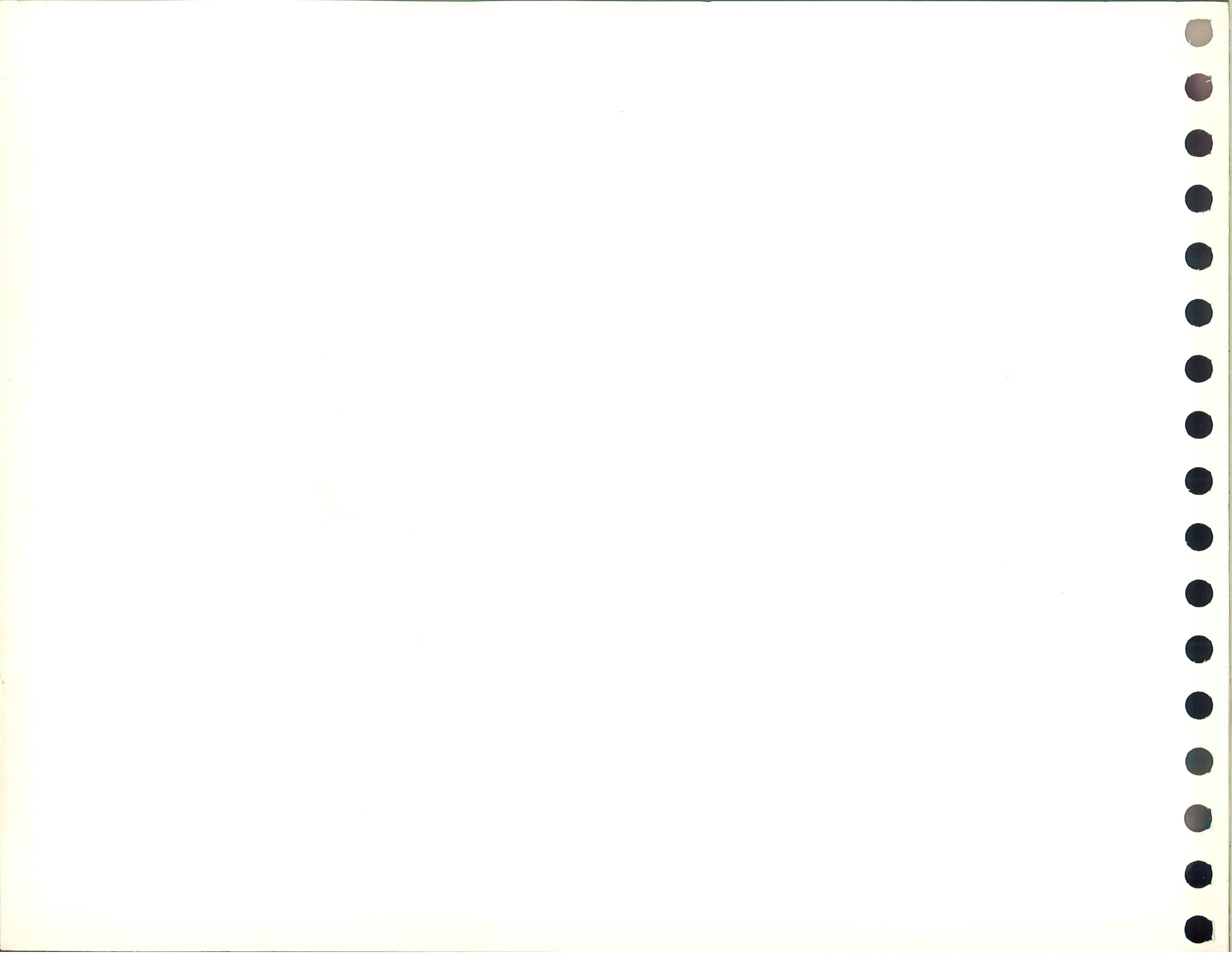


45

Precast concrete wall panels are fast and easy to erect. They can be lifted directly from delivery trucks onto the building frame. Attachment details are simple and effective.















DECORATIVE SURFACES



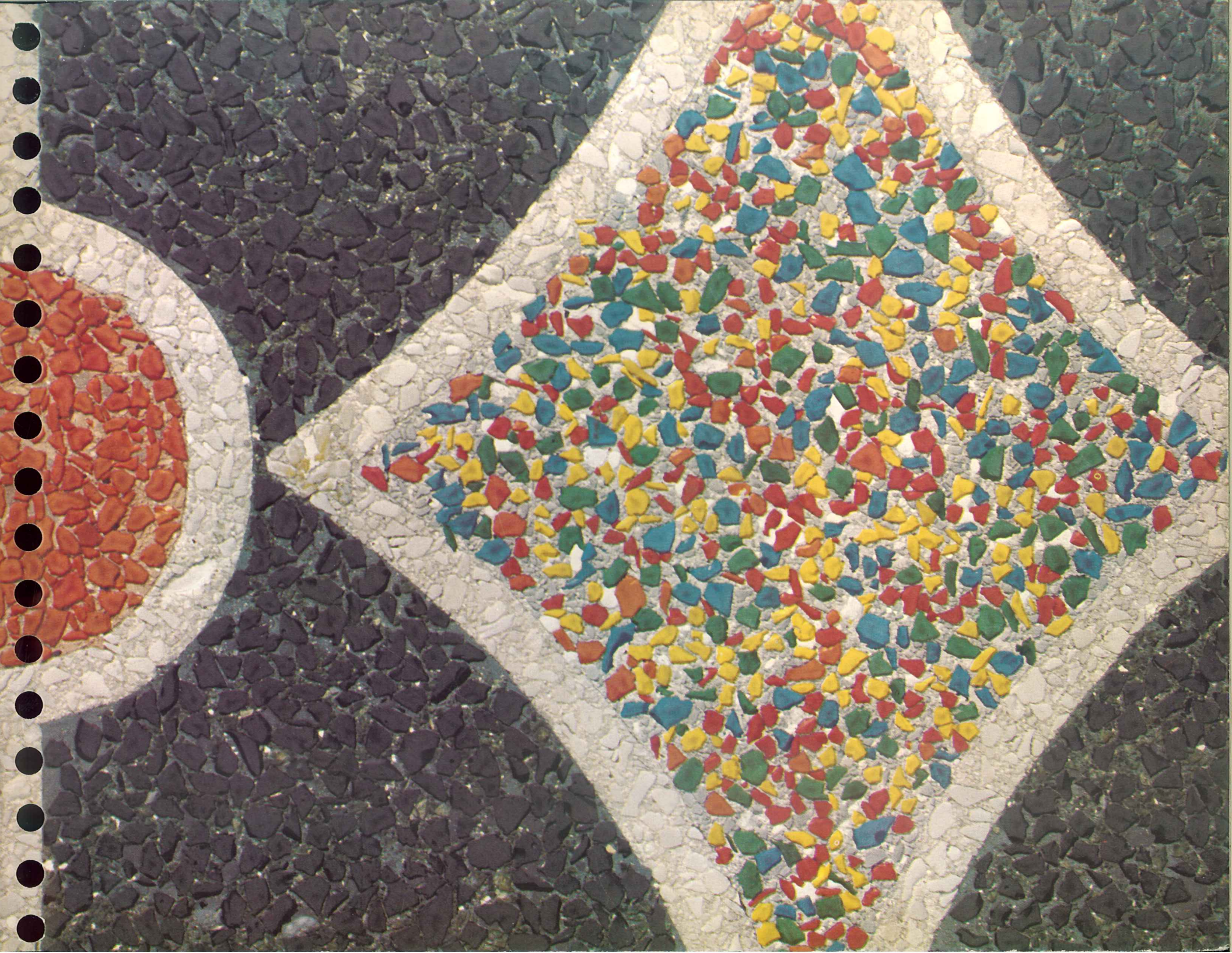


#### EXPOSED AGGREGATES

Because concrete is a plastic material that is cast in molds, there is practically no limit to the surface treatments possible. One popular technique is exposing in the surface of the concrete such selected decorative aggregates as marble, granite, quartz, ceramic tile, and various ceramic and vitreous materials.

46







47

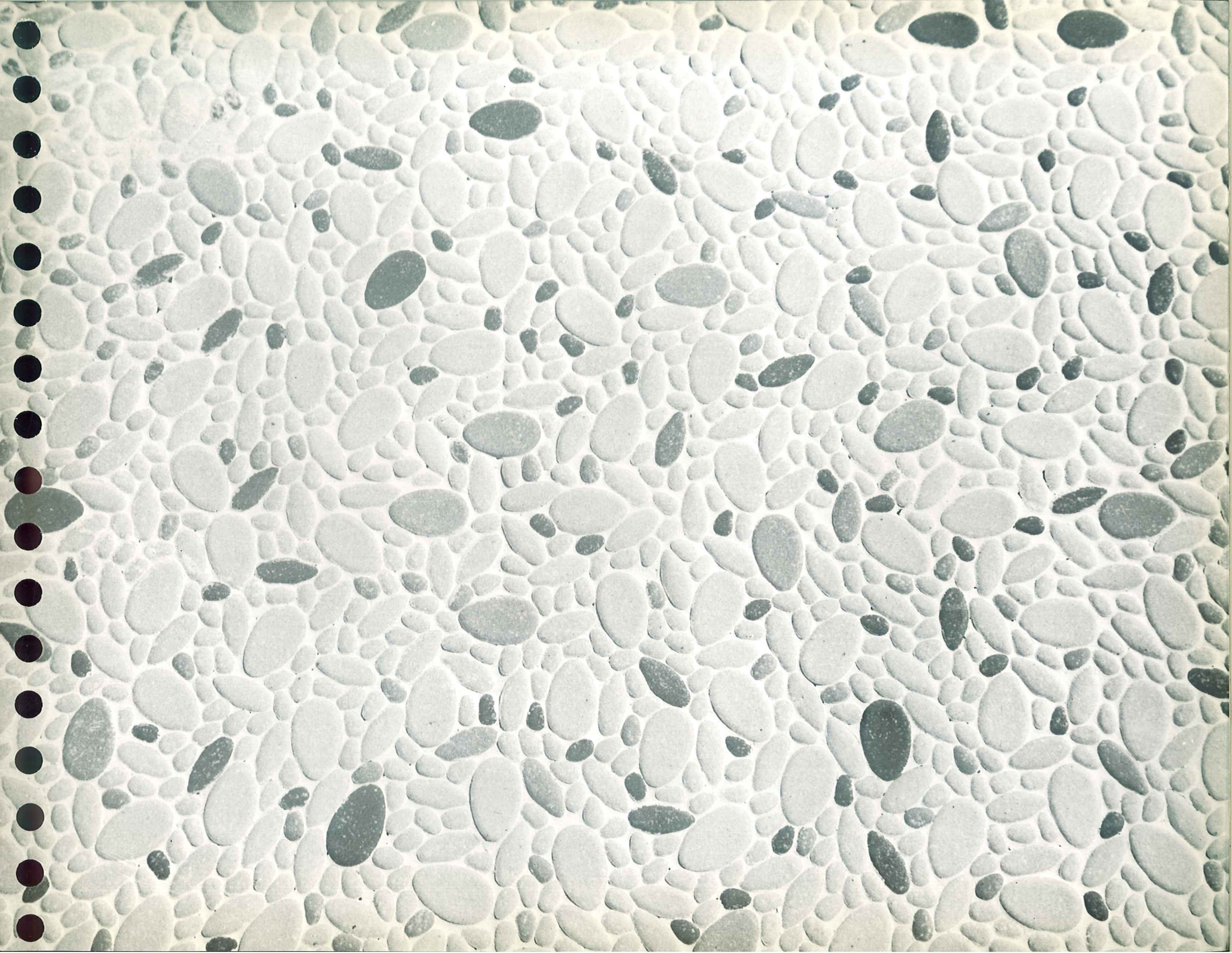






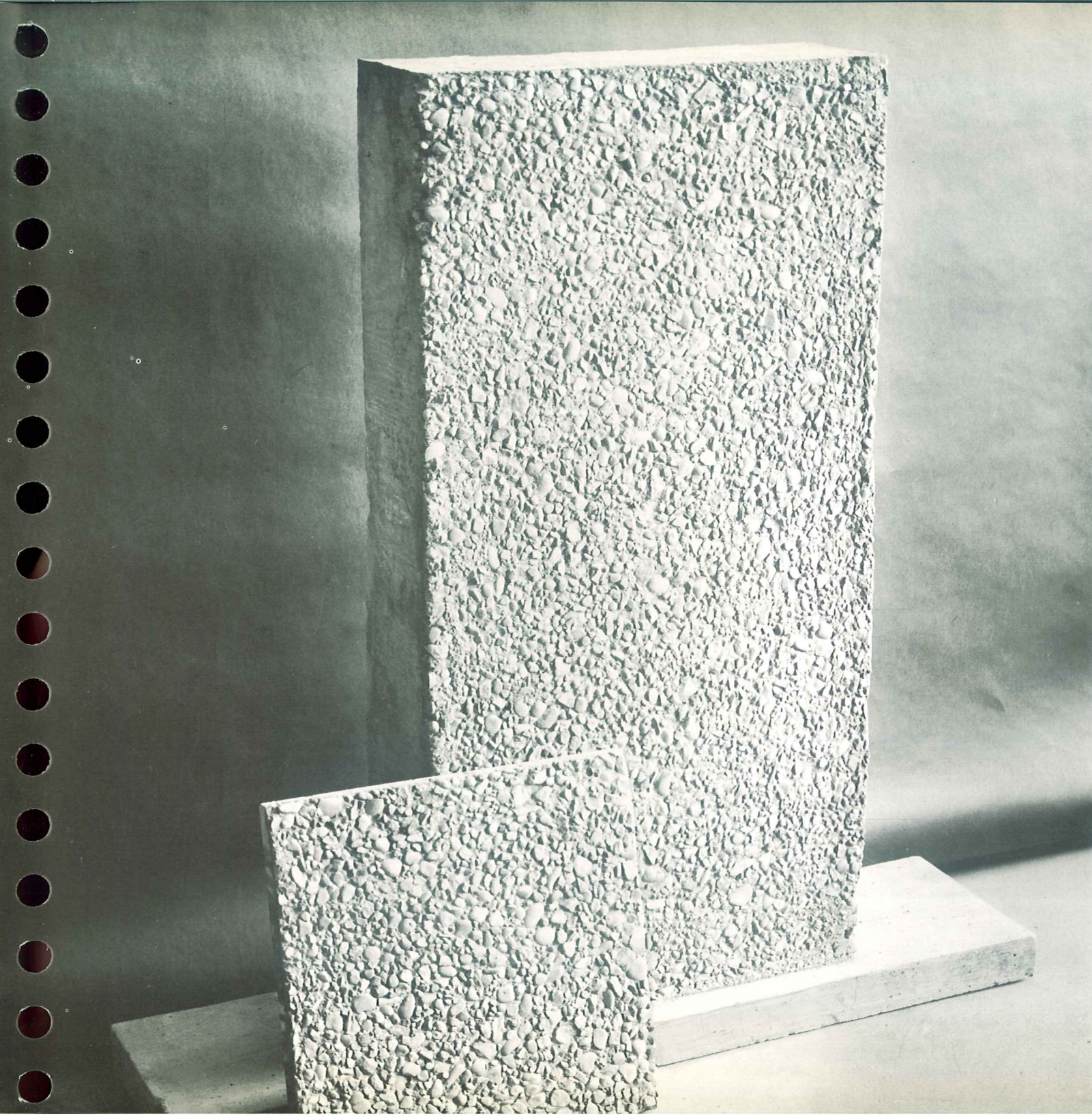
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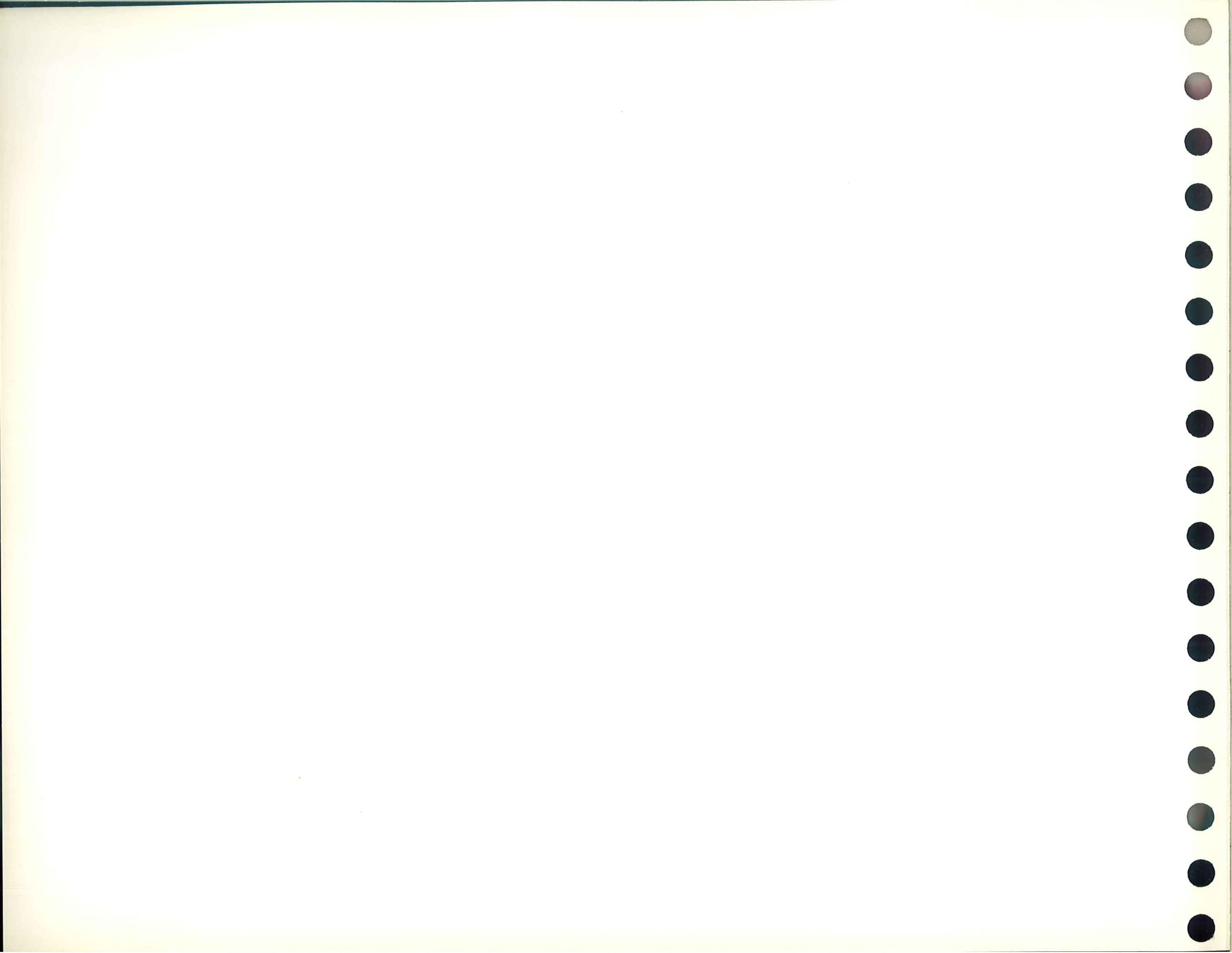




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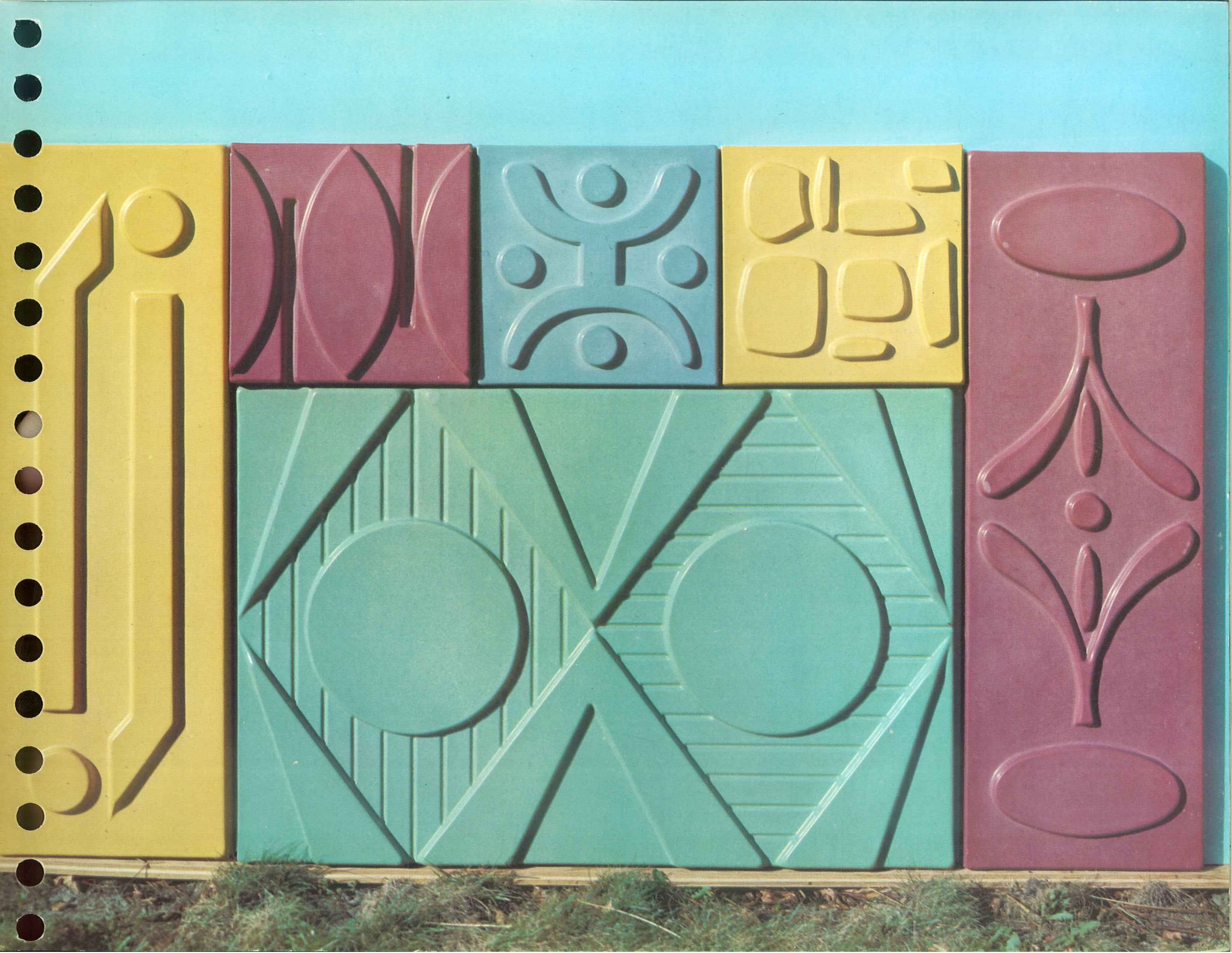


#### FORM LINERS

Countless textures and designs can be achieved by casting concrete against form liners. Materials used for such liners vary greatly, but some commonly employed include plaster, rubber, plastic, sand-blasted wood, and various composition materials.

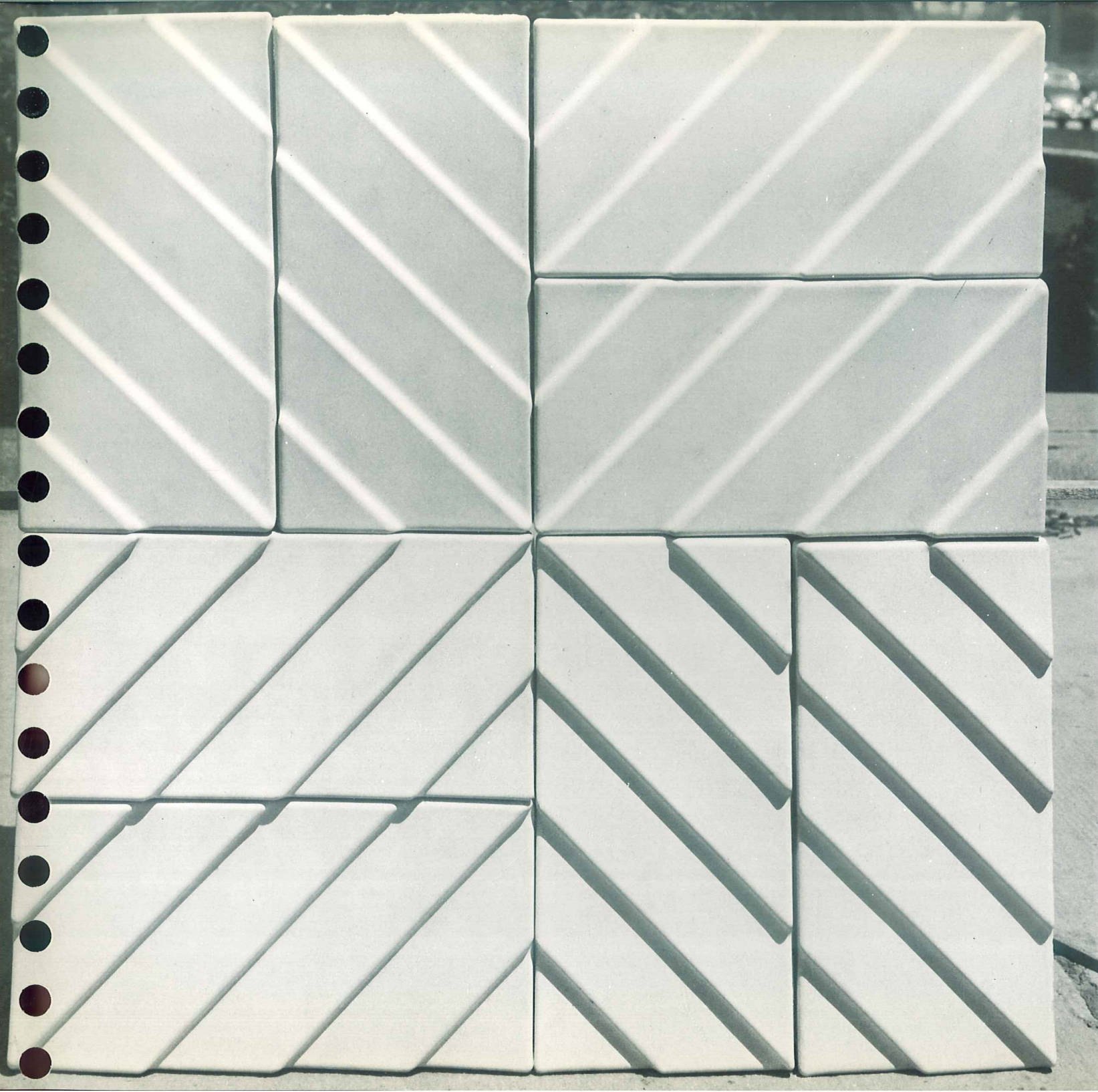
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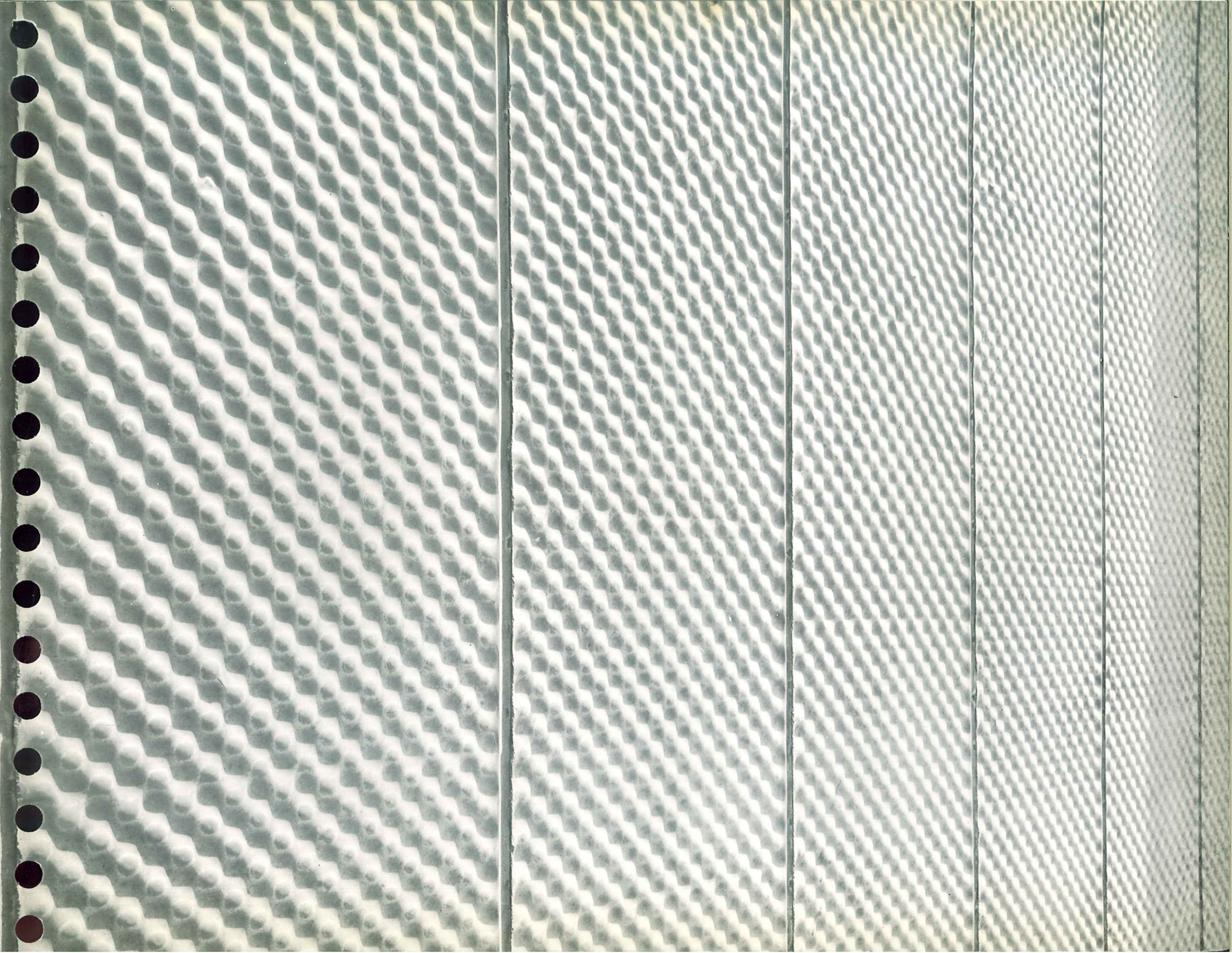
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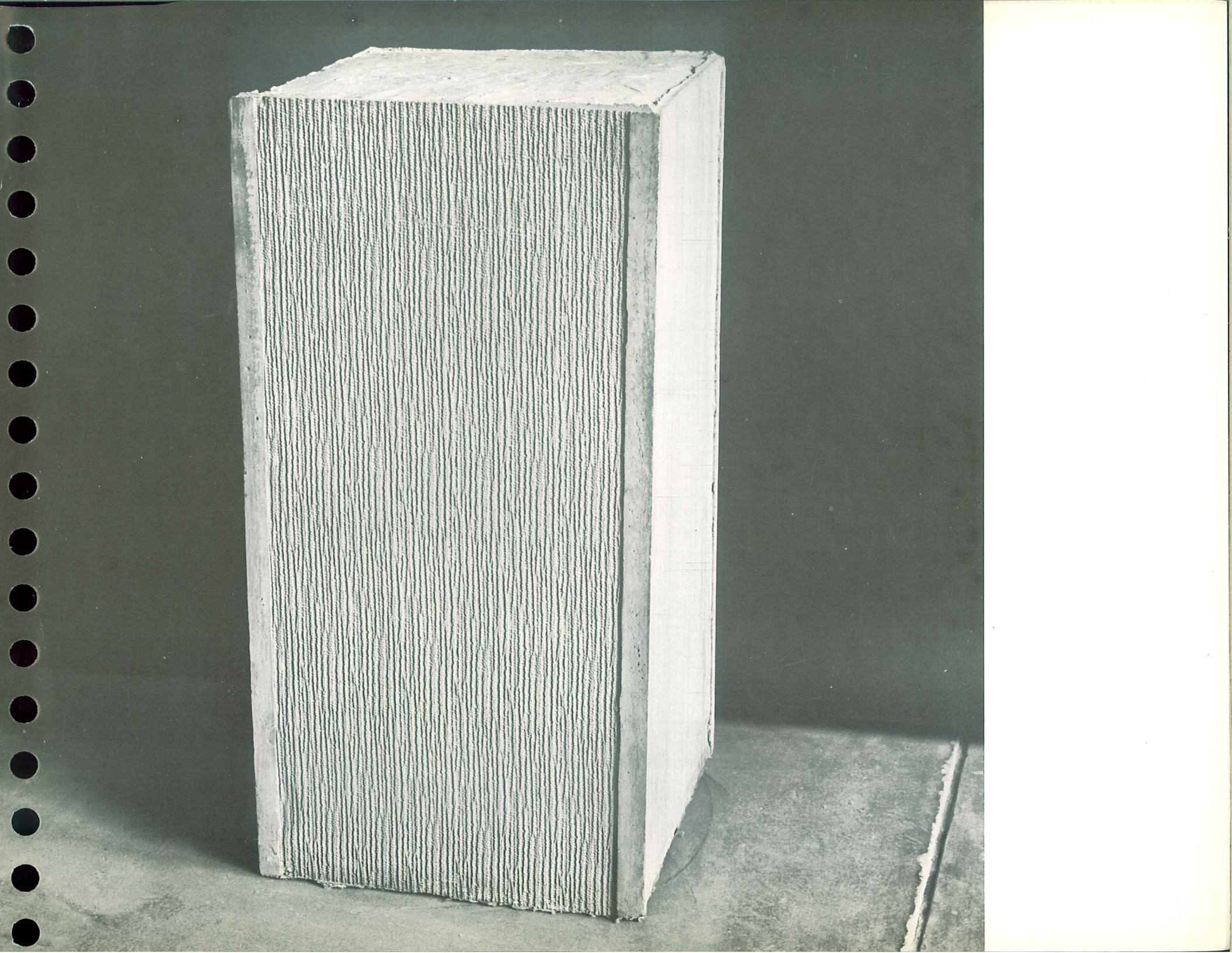






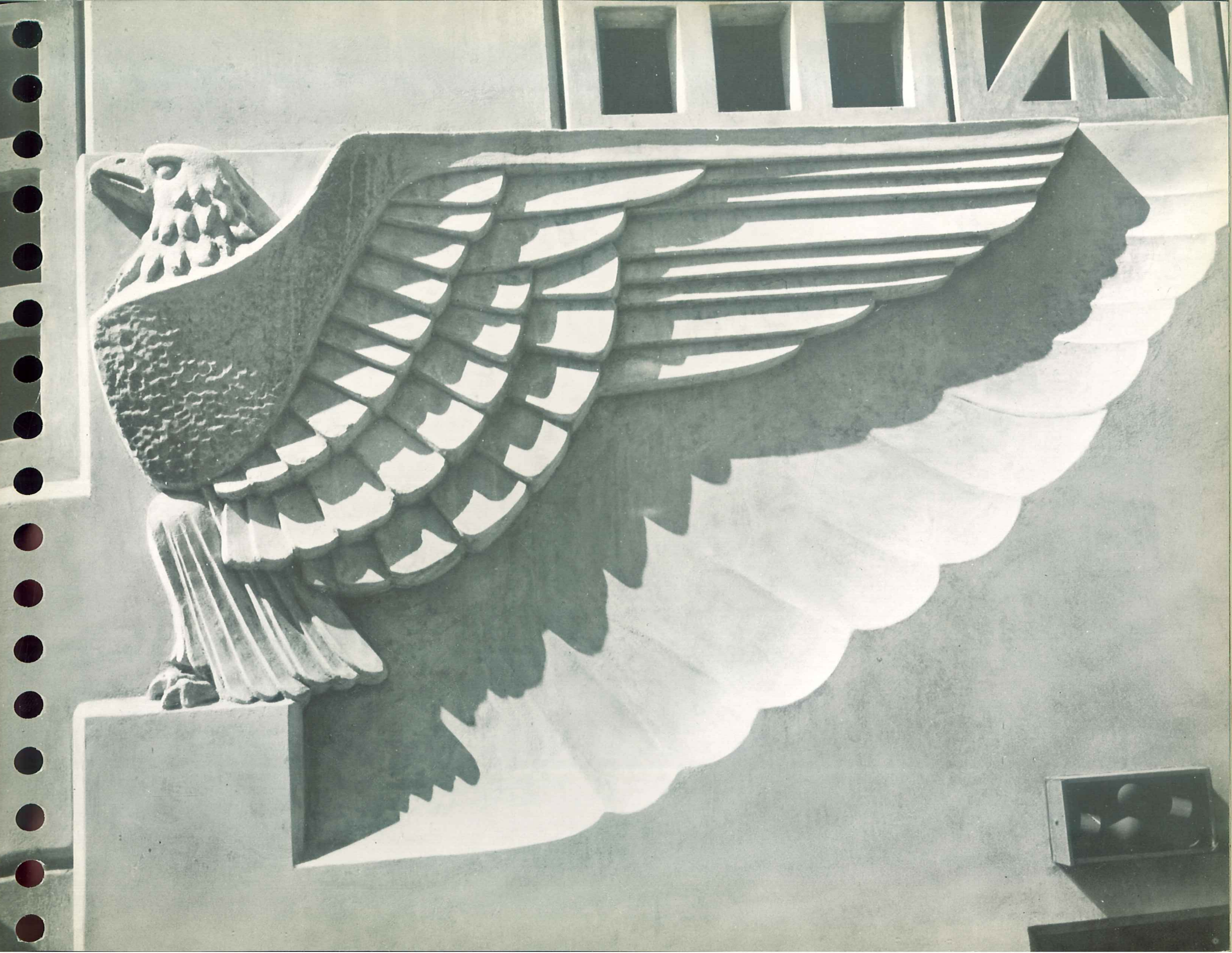
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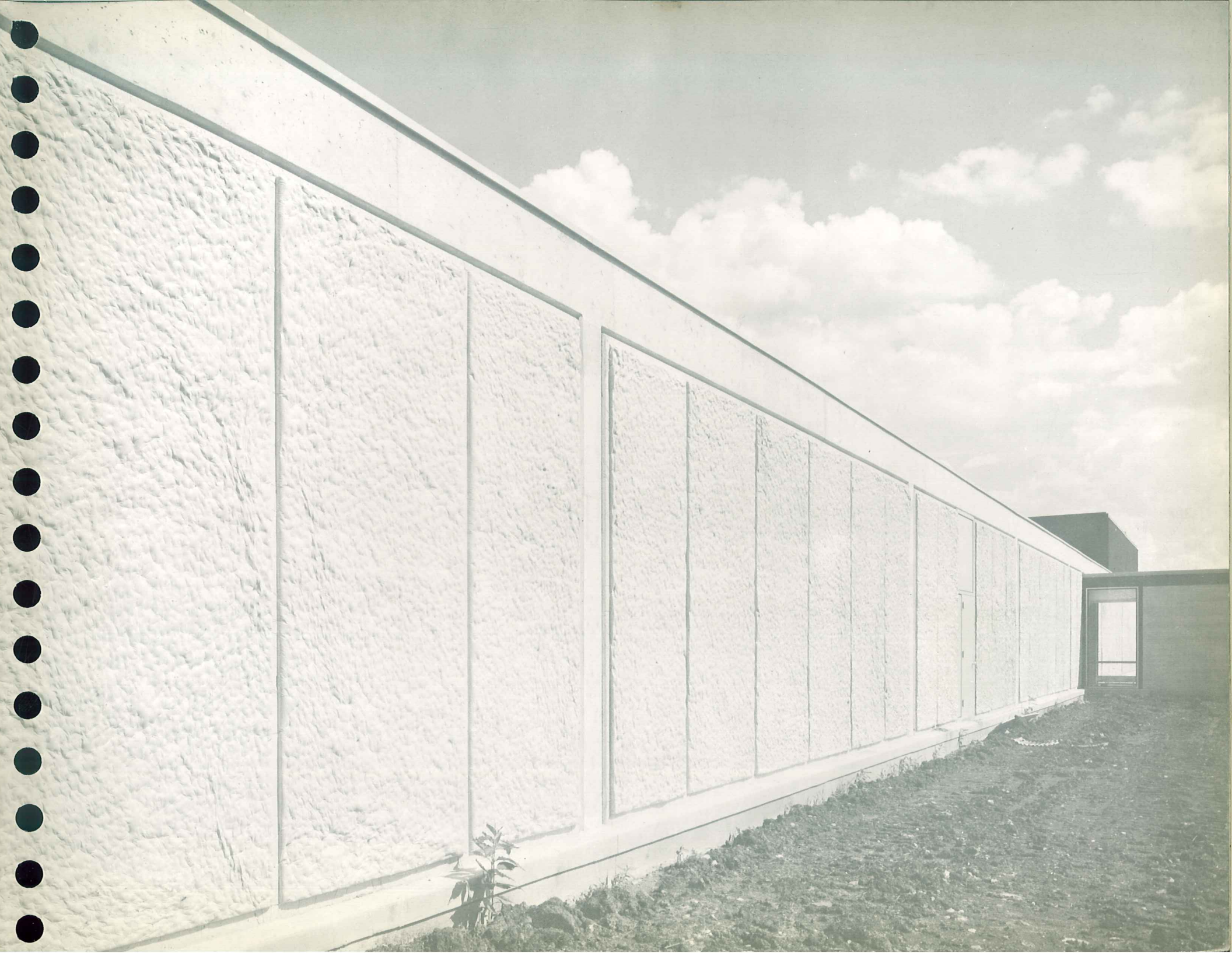
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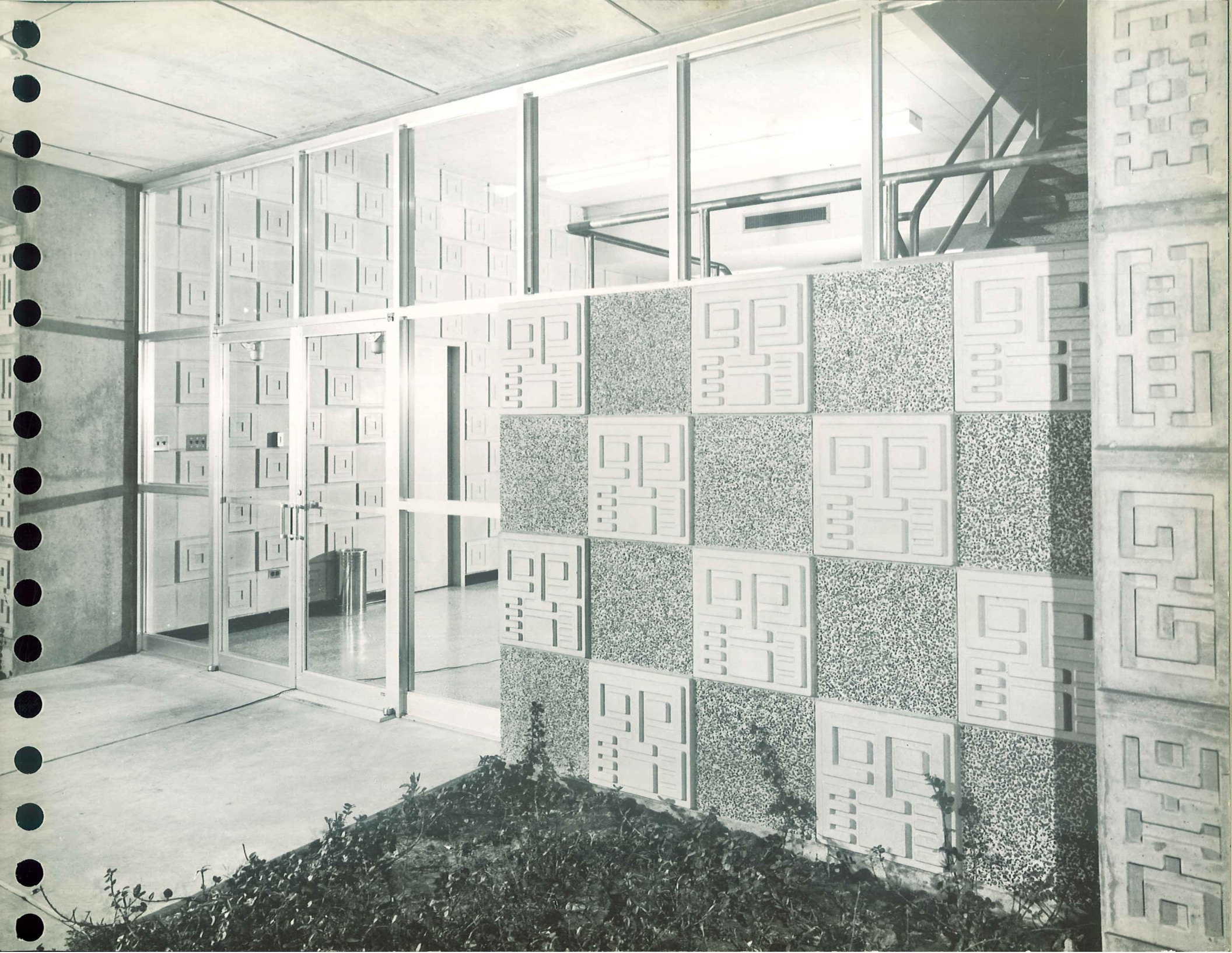
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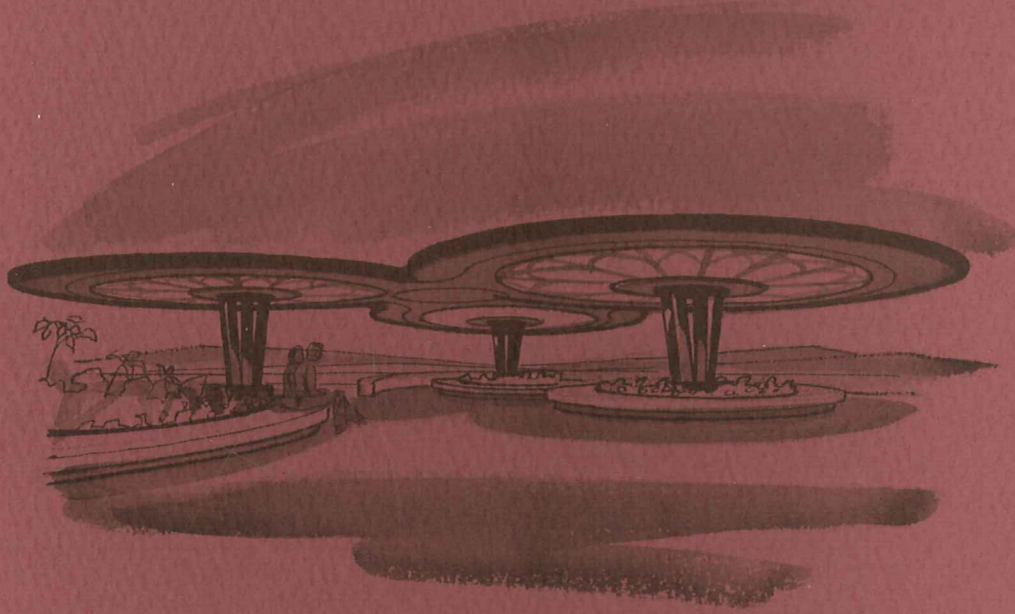
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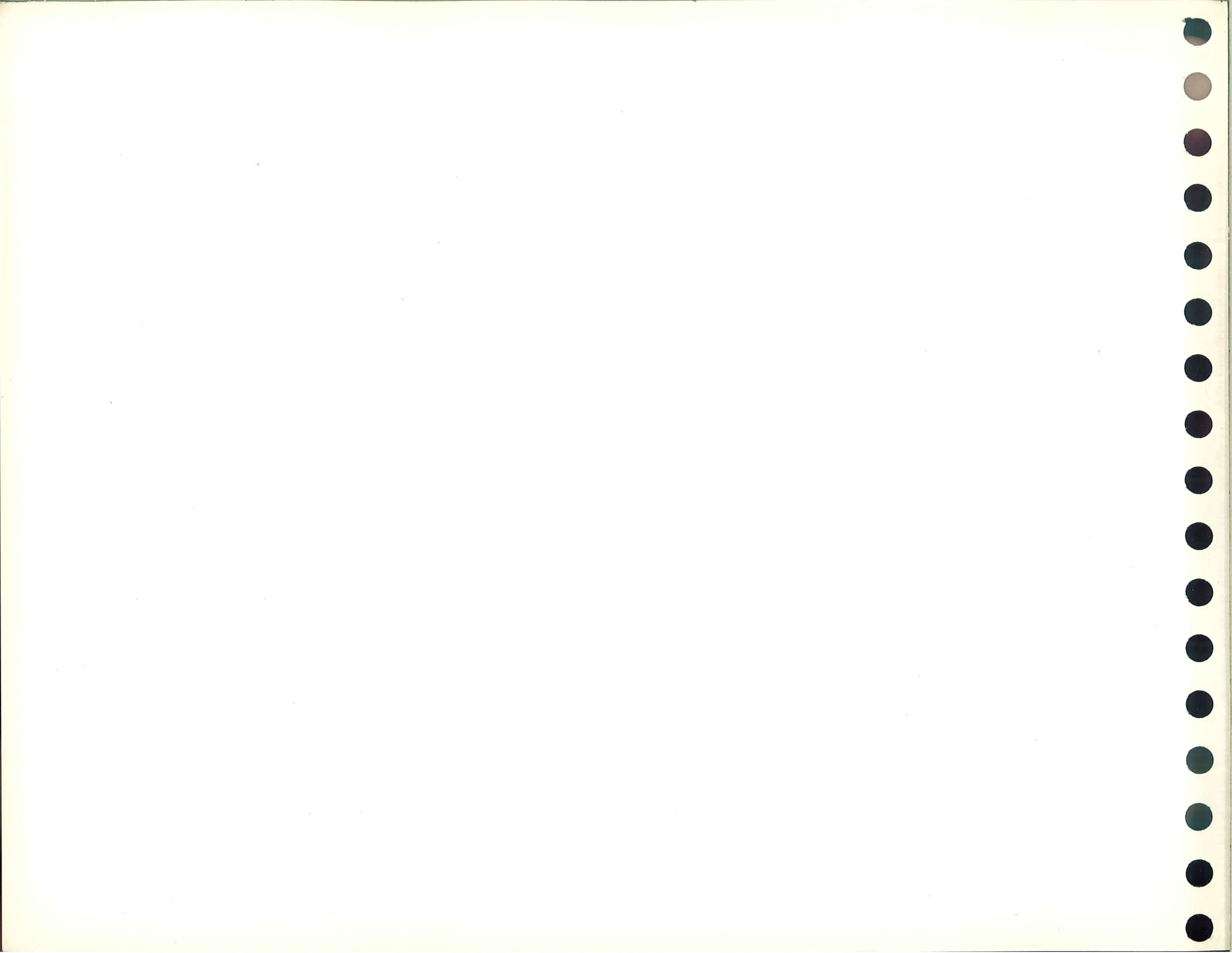








MISCELLANEOUS USES





There are many additional aspects of fair and exposition construction in which concrete can open new decorative vistas. These include walkways, waiting stations, entrance coverings, and sunshades.

60

Exposed-aggregate finishes are often used to produce striking walkways. In addition to their decorative potential, they offer excellent traction for milling feet.

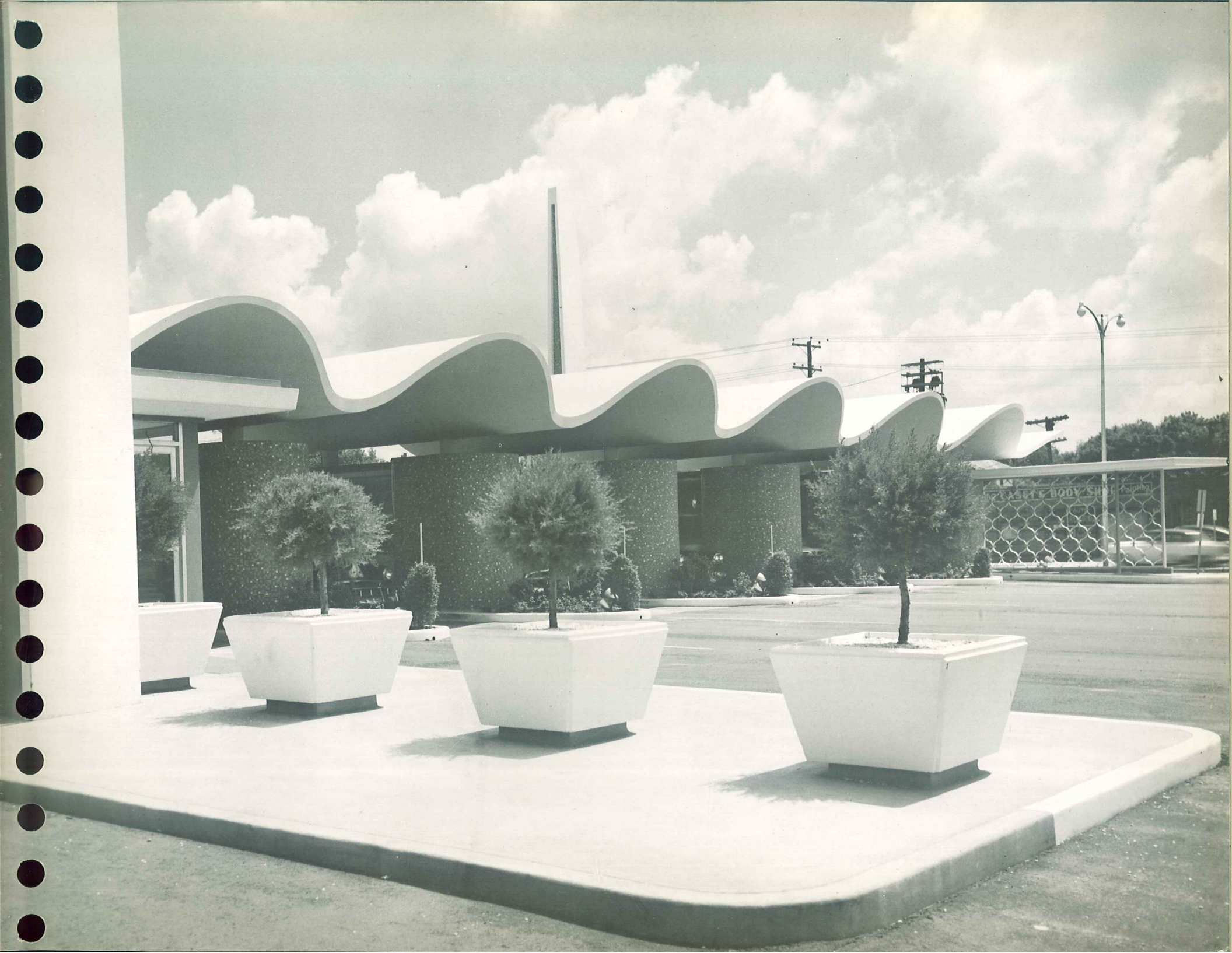




61

The undulating lines of a multiple-barrel shell roof grace this drive-in bank. Such construction makes an eye-catching entryway for a fair.





62

This drive-in bank offers another possibility for the design of combined entrance-paying shelters for fairs.







63

The modern sunshade of this beautiful school building in Connecticut is comprised of only two simple precast concrete elements.





64

Shells of various shapes roof the play areas and walkways of this California playground.





65

Thin concrete pergolas shade this resting place on a promontory in Ohio.





66

Concrete folded-plate shells with “egg-crate” shades spanning between them cover the beautiful mall of this Georgia shopping center.





67

Bus stop shelters of umbrella-shaped shells are attractive and practical. Their ability to cantilever for great distances renders shells invaluable for many such applications.

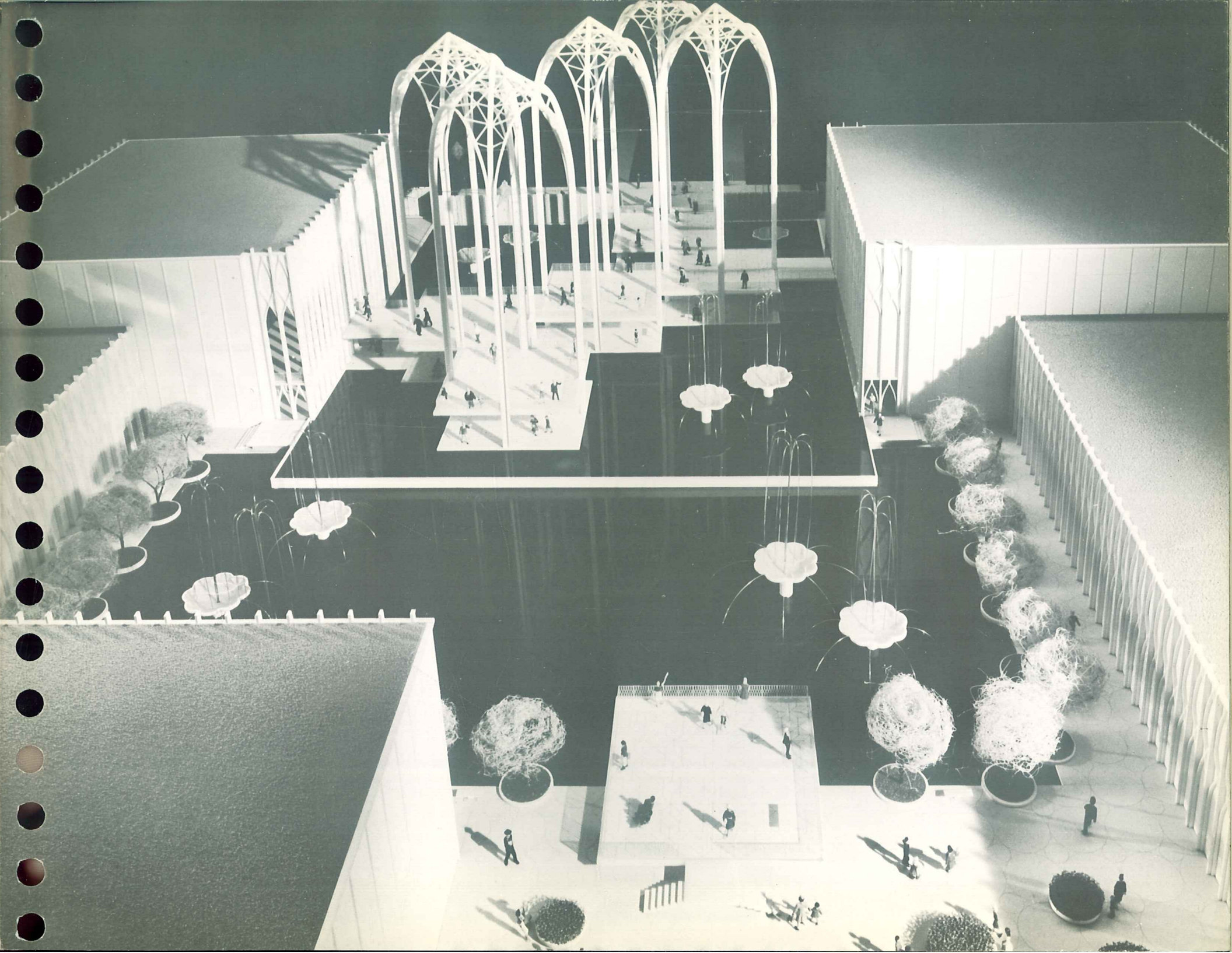


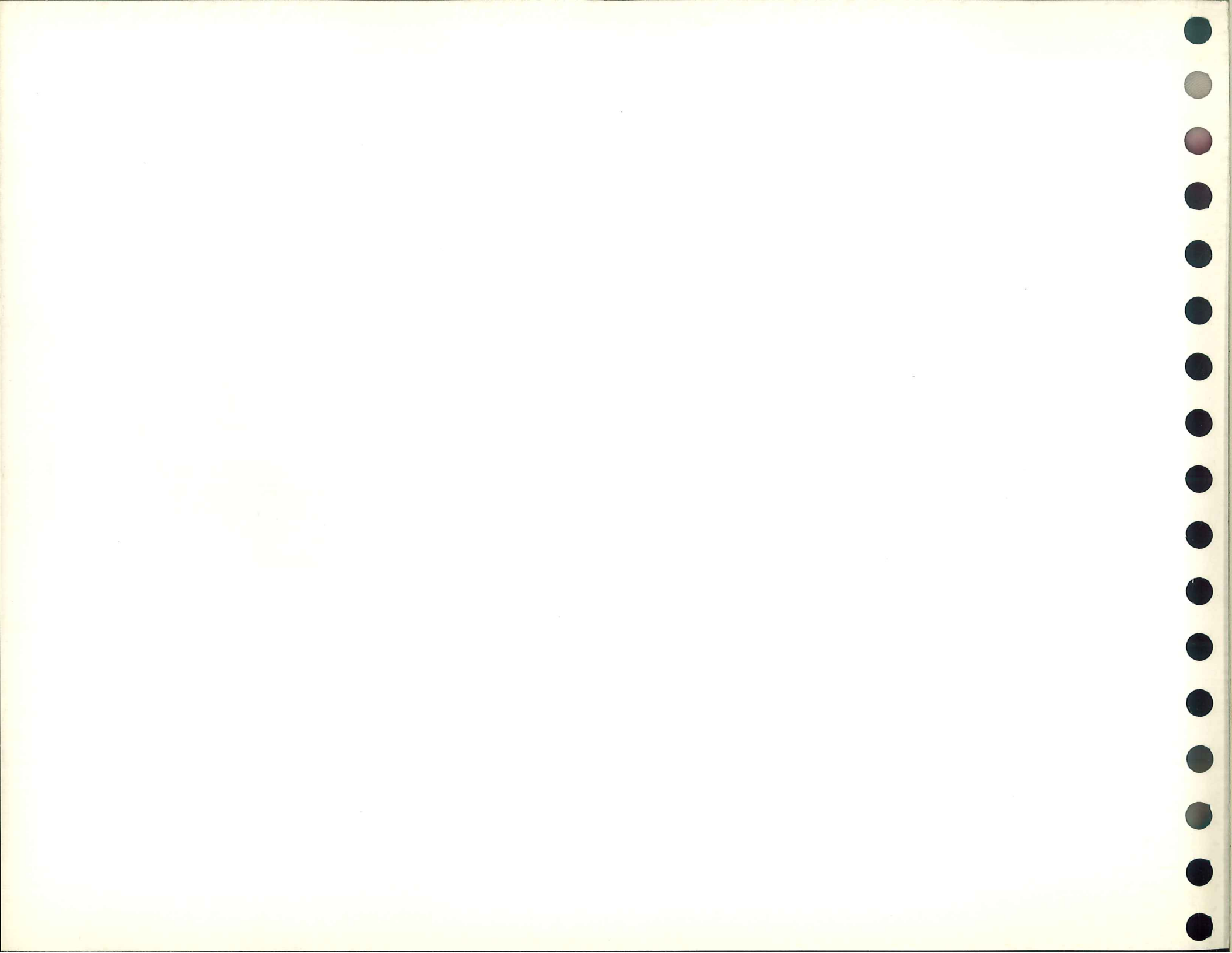


68

This model of a large complex of exposition buildings to be built by the U.S. government at a fair in Washington illustrates the value of concrete for such use. From the 90-ft. airy entrance towers to the patterned curtain walls, concrete is used to great advantage.

















## LIST OF ILLUSTRATIONS

Fig. 1 U.S. science exhibit, Century 21 Exposition, Seattle, Wash. Architect: Minoru Yamasaki.

Figs. 2 and 3 William B. Greeley Memorial Forestry Laboratory, Yale University, New Haven, Conn. Architect: Paul Rudolph.

Fig. 4 Sydney C. Phillips Junior High School, Mobile, Ala. Architect: Ellis and Winter.

Fig. 5 Azusa High School, Azusa, Calif. Architect: Neptune and Thomas.

Fig. 6 National Bank of Washington, Industrial Branch, Tacoma, Wash. Architect: Robert B. Price.

Fig. 7 Parking facility, Abraham and Strauss department store, Hempstead, N.Y. Architect: Tishman Research Corp.

Fig. 8 Woodrow Wilson High School, Tacoma, Wash. Architect: Lea, Pearson and Richards.

Fig. 9 Butler Library, Wayne University, Detroit, Mich. Architect: Minoru Yamasaki.

Fig. 10 Medical Research Center, University of Pennsylvania, Philadelphia, Pa. Architect: Louis Kahn.

Figs. 11 and 12 Restaurant, Xochimilco, Mexico. Architect: Felix Candela.

Fig. 13 Restaurant, Ida Cason Callaway Gardens, Pine Mountain, Ga. Architect: AECK Associates.

Fig. 14 Zion Evangelical Church, Milwaukee, Wis. Architect: William P. Wenzler.

Fig. 15 Lutheran Church of the Resurrection, Canoga Park, Calif. Architect: Jeff Elmandorf.

Fig. 16 Refreshment stand, Arts Festival, Laguna Beach, Calif. Architect: Don Williamson.

Fig. 17 North Shore Congregation, Glencoe, Ill. Architect: Minoru Yamasaki.

Fig. 18 Paul's Valley School, Paul's Valley, Okla. Architect: Jack L. Scott and Associates.

Fig. 19 Our Lady of Grace Church, Higüey, Dominican Republic.

Fig. 20 Elks Club, Duncan, Okla. Architect: Cottingham and Cook.

Fig. 21 Palazetto dello Sport, Rome, Italy. Architect: Annibale Vitellozzi.

Fig. 22 McGregor Memorial Center, Wayne University, Detroit, Mich. Architect: Minoru Yamasaki.

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Fig. 26 Baldwin Building, Miami, Fla. Architect: Alfred Browning Parker.

Fig. 27 DeWitt-Waller Junior High School, Enid, Okla. Architect: Dura A. Smith.

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- Fig. 36 Republic Savings and Loan Co., Dallas, Texas. Architect: Fisher and Jarvis.
- Fig. 37 Gimbels department store, Mayfair Shopping Center, Wauwatosa, Wis. Associated architects: Grassold & Johnson Associates, Welton Becket & Associates.
- Fig. 38 Allstate Insurance Co., Atlanta, Ga. Architect: Stevens and Wilkinson.
- Fig. 39 Holman Methodist Church, Los Angeles, Calif. Architect: Kenneth Lind.
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- Figs. 43 and 44 Congregation B'Nai Israel, St. Petersburg, Fla. Architect: Frank A. Bonsey.
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- Fig. 64 City Terrace Park, Los Angeles, Calif. Architect: Bowerman and Hobson.
- Fig. 65 Shelter, Fairview Heights Park, Cincinnati, Ohio. Architect: R. Carl Freund.
- Fig. 66 Lenox Shopping Center, Atlanta, Ga. Architect: Toombs, Amisano and Wells.
- Fig. 67 Crossroads Restaurant, Dallas, Texas. Architects: Richard S. Colley, O'Neil Ford. Associates: A. B. Swank, S. D. Zisman.
- Fig. 68 U.S. science exhibit, Century 21 Exposition, Seattle, Wash. Architect: Minoru Yamasaki.



